

COMMERCIAL. No. 22 (1884).

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FURTHER REPORTS

RESPECTING THE

CHOLERA EPIDEMIC IN EGYPT

AND THE

PROCEEDINGS

OF THE

GERMAN SCIENTIFIC COMMISSION.

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*Presented to both Houses of Parliament by Command of Her Majesty.*  
1884.

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## Further Reports respecting the Cholera Epidemic in Egypt: 1883-84.

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No. 1.

*Sir E. Baring to Earl Granville.—(Received September 26.)*

My Lord.

*Cairo, September 13, 1883.*

I HAVE the honour to inclose copy of a despatch from Surgeon-General Hunter reporting that of the twelve doctors who came out from England to serve under the Egyptian Government, ten have been paid off in full, and the two others will in all probability shortly likewise be paid and permitted to leave the country. Dr. Hunter also forwards a letter from Dr. Salem Pasha expressing his thanks for the services of these gentlemen.

I have, &c.  
(Signed) E. BARING.

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Inclosure 1 in No. 1.

*Surgeon-General Hunter to Sir E. Malet.*

Sir,

*Cairo, September 13, 1883.*

I HAVE the honour to report, for the information of Her Majesty's Government, that the medical gentlemen, names as per margin,\* have, consequent on the epidemic of cholera having ceased here, been recalled from their respective posts, and were on the 10th instant paid up in full by the Egyptian Government, and permitted to take their departure.

Dr. Acland, with the sanction of his Excellency Dr. Salem Pasha, will continue to do duty with the Egyptian Army until the period for which he was engaged has expired, or until relieved by Surgeon Rogers, Army Medical Department, who has been appointed to the medical charge of the Egyptian Army.

Drs. Gulliver and Taylor, who have been employed lately in Upper Egypt, will in all likelihood be recalled immediately, cholera no longer existing in the districts to which they stood appointed, and like the others will be paid off.

It affords me great pleasure to inclose a letter from Dr. Salem Pasha expressive of his satisfaction with the manner in which these gentlemen individually and collectively have performed their duties, and I would wish also to express my own appreciation of the tact and judgment displayed by them under most trying and difficult circumstances. As a body, too, they have incontestably proved that the fellaheen are as anxious as any native of India to obtain medical advice; they have thus completely refuted the charges made to me by medical officers in the service of the Egyptian Government, and also by others, that the fellaheen are obstinately opposed to seeking medical advice.

I have, &c.  
(Signed) W. G. HUNTER.

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\* Drs. MacNally, Acland, Crookshank, Cantlie, Porter, Thrupp, Leslie, Wyborn, Wilkins, and Honmar.  
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Inclosure 2 in No. 1.

*Dr. Salem Pasha to Surgeon-General Hunter.*

Sir,

*Cairo, September 11, 1883.*

ON the eve of the departure of the medical men sent to Egypt by the British Government during the cholera epidemic the President and the members of the Conseil de Santé beg to express the high opinion they have formed of the work accomplished under difficult circumstances by the whole and every one of the gentlemen individually.

Pray accept on behalf of the President and members of the Conseil de Santé the expression of the satisfaction they feel in acknowledging the value of the service rendered by the gentlemen who are returning home.

We beg, &c.  
(Signed) DR. SALEM.

No. 2.

*Lord Amphilh to Earl Granville.—(Received October 18.)*

My Lord,

*Berlin, October 16, 1883.*

I HAVE the honour to inclose copies of the Report addressed to the Secretary of State for the Interior, Herr von Boetticher, by Dr. Koch, the Chief of the German Scientific Expedition sent by the Imperial Government to Egypt to inquire into the origin and nature of the recent cholera epidemic, dated Alexandria, the 17th September last.

Dr. Koch states that the cholera has already died out in all the large cities of Egypt, that it is only in the villages of Upper Egypt that the epidemic still shows some vitality; but that the Egyptian Government are opposed to any scientific inquiries being made in that region on the ground that the peasantry would not allow *post-mortem* examinations to be made.

Dr. Koch, therefore, is anxious to continue his investigations elsewhere, and asks leave for the mission to proceed to India, where, "in several of the large cities, and especially in Bombay, the cholera is still so prevalent that there is every likelihood of the disease for the present holding its own."

The official "Reichs und Staats Anzeiger" adds that the Government have granted leave to the mission to proceed to India, and that the members of that body will shortly leave Egypt for Bombay.

I may add that Dr. Koch makes special mention of the attention he and the members of the mission received from the doctors of the Greek Hospital in Alexandria.

I have, &c.  
(Signed) AMPHILL.

Inclosure in No. 2.

*Report.*

(Translation.)

DR. KOCH, the Head of the Scientific Commission despatched to Egypt to investigate the cholera, has sent in the following Report upon the progress of its work:—

*"Alexandria, September 17, 1883.*

"As the cholera epidemic was already rapidly declining when the Commission arrived in Egypt, it was plain at the outset that we could not hope to obtain the material requisite for the whole scope of our investigations in this country. As, moreover, the time when an epidemic is dying out is the least propitious for its etiological investigation, we abandoned the original plan of carrying out in Egypt the necessary preliminary studies in order to utilize these, should the cholera spread to Syria, in places newly attacked by the cholera which would have offered a good field for investigation.

"The first part of this plan it has hitherto been found possible to carry out as well as could be wished, for during its sojourn in Alexandria the Commission had sufficient opportunity of amassing the necessary material for its preliminary researches. For this I am chiefly indebted to the ready help afforded by the physicians of the Greek Hospital, who

contributed in the most effectual manner to further the objects of the expedition by giving the members of the Commission access to all cholera cases brought to the hospital, and placing dissecting-rooms and cholera corpses at their service.

"At first the Commission installed itself in two well-lighted adjoining apartments on the ground-floor of the hospital. In one room microscopic work was done, and in the other artificial propagation experiments were conducted. The animals to be experimented on were brought into both. But as the number of the animals increased, and as, moreover, it seemed dangerous to manipulate the infectional matter in the same rooms in which one had to remain nearly the whole day, these animals to be experimented upon were taken to an entirely separate room in the old hospital, and the infection experiments there carried out.

"The material for investigation was obtained from twelve cholera patients and ten cholera corpses. Of the patients, nine were observed in the Greek, two in the German, and one in the Arabic hospitals. The symptoms of each case answered in all respects to those of true Asiatic cholera. Samples of the blood and evacuations of these patients were procured and examined. As the blood was soon ascertained to contain no micro-organisms, and the vomit to be also comparatively free from them, but the evacuations were found to contain considerable quantities of them, the latter were chiefly used for infection experiments upon animals.

"Although the number of corpses which have been dissected is but small, it has so happened that they have been of great value in influencing the direction of our researches. The most diverse nationalities are represented (three Nubians, two Austrian-Germans, four Greeks, one Turk), as well as various ages (two children, two over 60 years of age, the others between 20 and 35 years old), and cases of different duration of the malady. The circumstance, however, which is of the greatest importance is that the corpses were, in most instances, able to be dissected immediately, or, at latest, but a few hours after death. The changes produced by decomposition in the organs, and particularly soon in the intestine, and which render the microscopic investigation of these organs in the highest degree difficult, and for the most part quite illusory, were thus with certainty excluded. I must, indeed, attach all the more weight to this circumstance, as it will scarcely be practicable to obtain elsewhere such suitable material for microscopic investigation.

"Both the material obtained from the corpses and the symptoms of the patients while in life left no doubt that it was true cholera we were dealing with, and not, as was at first asserted in various quarters, cholera-like, so-called cholericform or choleroid diseases.

"Neither in the blood nor in the organs which, in other infectious diseases, are usually the seat of micro-parasites, viz., the lungs, spleen, kidneys, liver, could any organized infectional matter be detected. Occasionally bacteria were found in the lungs, which, however, as appeared from the maintenance of their form and from their situation, had nothing to do with the real process of the disease, but had been inhaled into the lung with matter vomited from the stomach.

"In the contents of the intestine of cholera patients, as well as in their evacuations, micro-organisms were found in the most extraordinary number and of the most diverse kinds. No particular species, however, predominated. Nor were there any specific indications of a connection with the process of the cholera.

"On the other hand, the intestine itself supplied most important data. In all cases but one which had terminated fatally, several weeks after extinction of the cholera, from a succeeding illness, a particular kind of bacteria was found in the coats of the intestine. These bacteria are rod-shaped, and belong accordingly to the genus bacilli; they resemble most nearly in size and form the bacilli found in glanders. In cases where the intestine shows the very slightest changes microscopically, the bacilli had penetrated into the follicular glands of the intestinal mucous membrane, and had there occasioned considerable irritation, as evidenced by the widening of the lumen of the gland, and the agglomeration of multinuclear round cells in the interior of the gland. In many instances the bacilli had also burrowed beneath the epithelium of the gland, and multiplied between the epithelium and the glandular membrane. Moreover, the bacilli had copiously settled on the surface, and in many cases penetrated into the tissue, of the intestinal villi. In the more severe cases where blood had filtered into the intestinal mucous membrane, the bacilli were found in great numbers, and had not limited their invasion to the follicular glands, but had travelled into the surrounding tissue, the deeper layers of the mucous membrane, and in parts even as far as the muscular coat of the intestine. The intestinal villi, also, were in such cases copiously occupied by bacilli. The chief seat of this devastation is in the lower portion of the small intestine. If this discovery had not been obtained from quite fresh corpses, it would have been of little or no value, because the influence of decomposition is sufficient to bring about such growths of bacteria in the intestine. For this reason



I was able to place no value on the circumstance that I had a year previously found, in a cholera intestine which I had received direct from India, the same bacilli, and in the same location, as in the Egyptian cholera cases, for complications due to *post-mortem* decomposition had always to be kept in view. This earlier discovery, made in the intestine of four different Indian cholera corpses, now, however, acquires extreme value, as all fear of an error arising from phenonema due to decomposition may now be confidently set aside. The similar condition of the intestine in both the Indian and Egyptian cholera supplies, too, further evidence for the identity of the two disorders.

"The number of cholera corpses submitted to examination is of course small. But as the bacilli were met with in all fresh cases of cholera, but were not found in the one case examined in which the cholera process had been extinguished before death, and in several others in which decease had ensued from other maladies, and which were also examined for purposes of comparison, there can be no doubt that they are in some way connected with the cholera process. The coincidence of cholera with the presence of bacilli in the intestinal mucous membrane does not yet, however, warrant the conclusion that the bacilli are the cause of the cholera. The relation between them may be the inverse, and the hypothesis might equally well be adopted that the process of cholera occasions such devastation in the intestinal mucous membrane as to enable some particular kind of bacilli from among the numerous parasitic bacteria constantly existing in the intestine to penetrate into the tissues of the intestinal mucous membrane. Which of these two hypotheses may prove to be the true explanation of the facts, that is, whether the process of the infection or invasion of the bacteria constitutes the primary disturbance, can only be decided by isolating the bacteria from the diseased tissues, propagating them artificially, and then regenerating the disease by means of infection experiments upon animals. Accordingly, it is of the first importance to have at command the animals susceptible of the desired infection. Now, in spite of all endeavours, we have not hitherto succeeded in rendering animals ill with cholera.

"Rabbits, guinea-pigs, dogs, cats, monkeys, pigs, rats, &c., have been subjected to numerous experiments, but without result in every case. The only data in this connection which deserve notice are those supplied by Thiersch, who saw a number of mice who had been made to consume the contents of a cholera-diseased intestine sicken and die from diarrhoea. This experiment is confirmed by reliable experimentors like Burdon-Sanderson, although disputed by others. In any case, it was necessary to repeat these experiments, since it is of the greatest importance to discover some species of animal susceptible of cholera. As it was very improbable that the requisite number of mice for this purpose would be soon obtained in Alexandria, fifty mice had been brought with us from Berlin, and the infection experiments begun at once upon them. Besides these, monkeys, which are the only brutes susceptible to some kinds of human infectious diseases, such as small-pox and *febris recurrens*, were also employed for these experiments. Finally, attempts were made to infect some dogs and chickens. But in spite of every endeavour no results in this direction were achieved. The most various specimens of cholera vomit and evacuations, and of choleraic intestinal contents, in some instances fresh, in others after the substances had been kept a considerable time, sometimes in cold, sometimes in warm rooms, and sometimes after desiccation, were administered to the animals in their food, but in no case did any choleraic symptoms manifest themselves, the animals remaining perfectly healthy.

"Bacilli from the contents of the intestine and from its coats were artificially propagated and were then introduced into animals in their food, and partly also by inoculation. In some instances these artificially propagated organisms, when imparted by inoculation, generated septic diseases, but with none of them could cholera be super-induced.

"That active virulent matter must often be contained in the evacuations of cholera patients is demonstrated by ample experience, particularly the frequent cases in which washerwomen who have had to cleanse linen soiled with choleraic excrement are attacked by the epidemic. Such a case occurred in the Greek Hospital, where a woman exclusively charged with this office took the disease.

"It may therefore be considered certain that some at least of the numerous samples of matter derived from cholera patients contained the infectional substance, and if our attempts to communicate the process failed, the reason may be that the trial animals may be wholly insusceptible of cholera, or that the proper mode of infection has not yet been found. Experiments both in this and in the other direction have yet to be carried on and modified, though there seems little prospect of obtaining a result in this direction with the material at present at disposal.

"It is not, indeed, very probable that the reason for the failure of the infection experi-



ments is to be sought in these circumstances. There is yet a third explanation which has much to support it. It is well known that in a place where cholera is raging the disease disappears long before all individuals have become its victims, and that, although the virus is copiously disseminated throughout the locality, the number of persons who fall ill keeps decreasing and the epidemic dies out in the midst of individuals who are susceptible of infection. This phenomenon is only explicable on the hypothesis that the virulence of the morbid matter is expended, or at least its activity becomes uncertain towards the termination of the epidemic.

"If, then, the infectious virus of cholera produces no effect upon the human species at the decline of the epidemic, it is not to be expected that it would affect animals, the very susceptibility of which to cholera is even yet a matter of doubt. Our trials, too, were made only with such substances at hand as were collected at the close of the epidemic, and which must be recognized as more or less inactive.

"It might be possible under favourable circumstances, *i.e.*, at the commencement of an epidemic, to infect animals, and by this means ascertain whether the bacilli shown by me to exist in the mucous membrane are the true cause of the cholera.

"But, however remote the results hitherto obtained by the Commission are from the complete solution of the problem before it, and of however little practical value for warding off the cholera, they may still be regarded as favourable when the adverse circumstances and brief duration of the investigation are considered. They answer perfectly the purpose of indicating the line of investigation to be followed, and go further, inasmuch as through the constant demonstration of the existence of characteristic micro-organisms they satisfy the first condition to be fulfilled in investigating an infectious disease, and determine a definite aim for further research.

"From the above it will be seen that the Commission could not at Alexandria have advanced further with the accomplishment of its tasks than has hitherto been done.

"It might now be a question whether the Commission should not pursue its investigations in some other part of Egypt which is suffering the visitation of the cholera. Insurmountable obstacles, however, stand in the way of such a design. The cholera has already disappeared from all the larger Egyptian towns, and only in the villages of Upper Egypt does the epidemic still continue to make any progress.

"The authorities of the Egyptian Government, however, are adverse to the prosecution of our researches in Upper Egypt on account of the serious inconveniences which the state of things there might occasion.

"As, moreover, we have been assured by trustworthy persons acquainted with the country that it would be impossible to obtain corpses for dissection in Egyptian villages, no design of following the progress of the cholera up the Nile can be entertained.

"In Syria, too, contrary to all that might be expected, the cholera seems to have gained no foothold.

"As the operations at present in hand can only occupy about a fortnight longer, our work will then be suspended for want of requisite material.

"The Commission, however, is animated with the earnest wish to proceed with the work which it has commenced, and, as far as may prove possible, bring its allotted task to conclusion. It would feel deep regret should the results which have already been obtained remain fruitless.

"The only possibility of continuing the inquiry at the present time is afforded by India, where the cholera still prevails in several large towns, particularly Bombay, to such an extent that its early extinction is not to be expected. There also it would doubtless be easiest to obtain the facilities afforded by a hospital, a matter which proved of such great advantage in Alexandria.

"I therefore most respectfully submit to your Excellency's favourable consideration the question whether, under actual circumstances, the investigations should be proceed with in India, and further most respectfully to offer my services for conducting the expedition should your Excellency decide upon its visit to India.

"I have here also to report upon further labours which the Commission found opportunity to conduct in connection with its investigations into the cholera. In Egypt parasitic and catching disorders are very numerous, and it was accordingly not difficult to procure objects for investigations undertaken partly for the sake of comparison to control the results obtained respecting cholera, partly for the sake of throwing further light on the general questions connected with infectious diseases.

"Thus I have already made two dissections in cases of dysentery. In one of these, which had reached an acute stage, a peculiar kind of parasite was found in the intestinal mucous membrane which does not belong to the group of the bacteria, and had been up till then unknown.

"I also dissected, in the Arabian Hospital, an Arab who had died from splenic affection of the intestine. The disorder was in this case probably to be referred to an infection caught from sheep, which are largely imported from Syria to Egypt, and here perish in number from inflammation of the spleen.

"The opportunity was further offered of observing in the Greek Hospital six cases of bilious typhus, a disorder which bears the closest resemblance to yellow fever, and has often been confounded with it, and is therefore of the highest interest. Three of these patients succumbed. These were dissected by me, and have been the object of careful investigations.

"Besides this, repeated investigations into the micro-organisms in the air and the drinking water of Alexandria.

"If time can be found, I propose to institute observations upon the Egyptian ophthalmia.

"The work of the Commission, in itself laborious, and for the main part of very unpleasant character, has been doubly difficult in consequence of the high temperature here prevailing; and although the course of our operations has not permitted a day's intermission, all the members of the Commission have enjoyed good health, with the exception of slight and transitory ailments due to the climate.

As soon as it is practical to interrupt our labours, I consider a pause of a few days for recreation necessary. I propose accordingly, partly for the sake of recreation, partly with the view to visit the chief focus of the epidemic in Egypt, and there institute inquiries into the behaviour of the disease, to proceed with the Commission to Cairo."

### No. 3.

*Sir E. Baring to Earl Granville.—(Received October 31.)*

My Lord,

Cairo, October 19, 1883.

I HAVE the honour to inclose an interesting Report prepared by two members (MM. de Binckhorst and Manusardi) of the "Comité International de Secours" at Mansourah. Your Lordship will observe that the Committee considers that there is an intimate connection between the cattle plague and the recent outbreak of cholera. The Committee does not treat specifically the question of whether the cholera was imported or was spontaneously produced in Egypt, but all their arguments tend to show that the theory of importation is erroneous. I fear, however, that the prejudices on this subject are so strong that nothing will convince the greater portion of the European public here that the cholera was not imported from India.

I have, &c.  
(Signed) E. BARING.

### Inclosure in No. 3.

*Pamphlet entitled "Rapport fait au Comité International de Secours à Mansourah."*

Messieurs,

CHARGÉS par vous de dresser un Rapport qui, tout en résumant les travaux de notre Comité, soit de nature à mettre en évidence la situation réelle avant et pendant l'épidémie, nous croyons avoir rempli notre mandat au gré de vos intentions, en nous efforçant de chercher et de reproduire:—

1. L'état sanitaire de notre province depuis le commencement du printemps jusqu'au moment où les autorités du pays ont signalé l'existence d'une maladie épidémique;

2. L'état de Mansourah lors de la formation de notre Comité et un aperçu de nos travaux jusqu'à ce jour.

D'après l'opinion publique généralement admise, le typhus bovin a éclaté et a sévi avec une rare intensité dans la Basse-Égypte depuis le commencement de l'année 1883.

Il y en a qui prétendent que cette maladie n'a jamais complètement quitté l'Égypte et que depuis des années elle est restée à l'état latent en se manifestant par des cas isolés.

Toutes données officielles font défaut: aucune enquête autorisée et sérieuse ne paraît avoir été faite.



Dans cette situation il est impossible de déterminer l'extension de la maladie et le nombre de ses victimes.

Il est toutefois avéré, et l'opinion publique est fixée sur ce point, que le typhus bovin—c'est ainsi que cette maladie a été généralement qualifiée—a enlevé une grande, sinon la plus grande partie du bétail. Cette épidémie a été signalée dès le mois de Février dans la Province de Charkieh; elle s'est manifestée ensuite dans le Dakablieh, et les habitants de Mansourah savent combien les villages situés aux environs ont été éprouvés.

D'après des personnes qui connaissent bien le pays et qui sont dignes de confiance, certaines contrées en Égypte auraient perdu jusqu'aux deux tiers du bétail, et l'agriculture Égyptienne aurait subi une perte dont elle aura de la peine à se relever.

Il est impossible en l'absence de données précises d'évaluer, même approximativement, le nombre des bestiaux emportés. Toutefois, nous craignons que si la lumière se fait jamais sur ce point, l'opinion publique sera effrayée de l'étendue du mal.

Il paraît que le Gouvernement ne s'est pas préoccupé de cette situation, ou que s'il s'en est préoccupé, il a été, sciemment, induit en erreur par ses propres fonctionnaires. La population indigène du pays ne voit qu'avec une certaine appréhension la préparation et la prise de mesures relatives à des objets d'une nature exceptionnelle. Elle aime à se soustraire au contrôle des autorités, elle craint la façon dont les fonctionnaires n'exécutent que trop souvent des instructions d'ailleurs sages; ignorante, attachée à ses coutumes, elle n'a aucune compréhension de la nécessité des mesures d'hygiène et c'est ainsi que les prescriptions hygiéniques édictées dans beaucoup de localités en Égypte n'ont eu qu'un commencement et un semblant d'exécution et sont allées se briser contre l'opposition, tantôt active, tantôt passive, de la population indigène.

Les cadavres des animaux morts n'ont jamais été enterrés; on les a jetés, après avoir enlevé la peau, dans le cours d'eau le plus voisin.

Ces cadavres en putréfaction ont empoisonné les cours d'eau et canaux, dans lesquels la population puise l'eau nécessaire pour la nourriture et pour les besoins du ménage.

Il y a plus. Dans beaucoup de cas les animaux reconnus atteints de la maladie ont été immédiatement abattus et la chair a été livrée à la consommation. L'oke, c'est un fait de notoriété publique, se vendait à une piastre courante, et la population s'est nourrie d'une chair plus que nuisible à la santé, et pouvant engendrer des maladies épidémiques.

Nous nous rappelons qu'aux mois d'Avril et de Mai la forte mortalité, tout exceptionnelle, qui s'est déclarée dans beaucoup de villages autour de Mansourah (entre autres dans les villages de Mit-Mazzah et Midet-Sandoub) a été attribuée à l'usage d'une viande infectée.

En suivant la marche et le développement du typhus bovin, nous croyons pouvoir affirmer dès à présent qu'il a précédé l'épidémie fébriforme et cholériforme qui a ravagé ensuite la population de l'Égypte.

Le typhus bovin a éclaté d'abord dans la province de Charkieh; nous tenons de bonne source qu'une épidémie caractérisée comme celle qui s'est déclarée ensuite à Mit-Mazzah et autres villages autour de Mansourah, par la diarrhée, des coliques et des vomissements, avec issue prompte et fatale dans la plupart des cas, se déclara dès le mois de Mars dans plusieurs villages du Charkieh et notamment à Kafr-Salamc, connu aussi sous le nom de Choubra-el-Enab.

Plus tard et à mesure que le typhus bovin s'étend et envahit le Dakablieh, les populations des endroits envahis sont successivement atteintes par le fléau.

Observation très importante.

Ce ne sont pas les localités situées sur le Nil qui sont envahies en premier lieu; l'épidémie humaine se manifeste d'abord dans les villages de l'intérieur, et les villes et villages sur le Nil ne sont envahis qu'après que l'épidémie a éclaté comme un coup de foudre à Damiette, en effrayant l'Égypte et l'Europe.

L'eau dans les canaux, devenue presque stagnante au commencement des chaleurs, quand le Nil est bas, a été empoisonnée par les carcasses en putréfaction et elle a engendré la maladie chez les hommes.

L'eau courante du Nil n'a charrié qu'une partie relativement minime des bestiaux morts; elle a été moins chargée de matières putrides.

A Damiette toutefois, il s'est présenté un concours des circonstances tout particulier et elle a été le premier des endroits atteints sur le bord du Nil.

Les centaines et les milliers de cadavres charriés par le Nil et que nous avons vu constamment passer devant Mansourah, ont été arrêtés à l'embouchure du Nil, devenu trop bas pour pouvoir les enlever et les transporter dans la mer. Il s'est formé ainsi une vaste flaque d'eau putride, laquelle échauffée par les rayons d'un soleil ardent est devenue un foyer d'infection et le premier propagateur de la maladie.

Nous ne nous arrêtons pas aux autres conditions hygiéniques de Damiette; elles ne sont malheureusement que trop connues.

De Damiette la maladie remonte le Nil et elle finit par entrer dans la période de décroissance dès que la crue du Nil s'est accentuée et que ses bords ont été recouverts d'eau et ne sont plus un réceptacle d'immondices et un vrai foyer de maladie.

Nous sommes persuadés que les recherches ultérieures établiront :—

1. Que le typhus bovin règne en Égypte depuis le commencement de 1883 ; qu'il a enlevé dans les contrées les plus éprouvées une grande, sinon la plus grande partie du bétail ;

2. Que l'épidémie qualifiée de choléra après son apparition à Damiette a suivi de près la marche du typhus bovin ; qu'elle a éclaté d'abord depuis le mois de Mars 1883 dans le Charkieh, ensuite dans le Dakahlieh ;

3. Que les villages placés sur les canaux où l'eau est devenue plus empoisonnée et plus insalubre ont été éprouvés les premiers ;

4. Que l'épidémie après avoir existé pendant des mois entiers a éclaté au grand jour à Damiette, devenu un foyer d'infection ;

5. Que ce n'est qu'en second lieu que les localités situées sur le Nil ont été atteintes à la suite de Damiette ;

6. Que l'autorité n'a pas pris de mesures efficaces ou n'a pas pu les mettre à exécution pour étudier et pour circonscrire l'épizootie et prévenir ainsi l'éclosion d'une épidémie malgré les avertissements répétés de la presse et de l'opinion publique.

Au moment même où nous dressons ce Rapport nous apprenons, et plusieurs des membres de ce Comité sont à même de l'affirmer, que l'épizootie bovine continue à sévir et que notamment de certaines communes de la province jusqu'ici épargnées sont visitées actuellement par le fléau.

Dès le 23 Juin l'épidémie éclata à Mansourah. Cependant la généralité du public n'en eut connaissance que le 25. Cette nouvelle jeta la population dans une consternation profonde.

Le Gouvernement décréta l'établissement d'un cordon qui a commencé à cerner la ville le 28 Juin.

Cette mesure qui devait logiquement avoir pour objet d'empêcher les habitants de Mansourah de sortir d'une ville devenue contaminée, fut interprétée dans un sens bien plus absolu, et Mansourah fut isolée du reste du monde.

Défense de sortir, défense d'entrer.

Il est en effet à notre connaissance que M. Charles Escalon, sorti le 28 Juin dans la matinée avant l'établissement du cordon, s'est vu refuser à son retour l'entrée par les soldats en faction à Talka. La permission d'entrer lui a été même refusée par son Excellence le Moudir à qui il l'avait fait demander, ce qui prouve que l'entrée à Mansourah était alors interdite. Toutefois et par amour de la vérité nous devons reconnaître que malgré ces défenses, M. Charles Escalon avait pu pénétrer en ville dans la soirée de ce même jour, grâce à un expédient fort en usage dans ce pays, ce qui prouve encore que le cordon ne fonctionnait pas régulièrement.

En même temps que le cordon a été établi, l'Administration des Chemins de Fer a cessé de délivrer des billets de voyageurs et des connaissements de marchandises à destination de Talka et Mansourah.

Les pharmaciens et les magasins alimentaires, pris au dépourvu, manquaient du nécessaire.

Il a fallu l'intervention de personnages influents et toute une série de formalités pour obtenir que la gare d'Alexandrie acceptât des colis de médicaments à destination de Talka et Mansourah.

Néanmoins lorsque des marchandises dont le départ avait été spécialement autorisé devaient franchir le cordon, il y avait à vaincre de nouvelles difficultés.

Nous savons tous combien de fois son Excellence le Moudir s'est plaint à nous de la conduite des commandants du cordon, lesquels, quand ils ne refusaient pas catégoriquement de recevoir les ordres qu'il leur donnait, en retardaient au moins l'exécution beaucoup plus qu'ils n'auraient dû le faire.

Le principal pharmacien de la ville, M. Tilche, qui a toujours eu à cœur de répondre promptement aux exigences de sa clientèle, a dû maintes fois se faire adresser par voie postale certains médicaments dont il y avait besoin pressant. M. Tilche n'aurait pas eu recours à ce mode d'expédition plus coûteux si le service des marchandises avait été régulièrement accompli par l'Administration des Chemins de Fer et si les colis de marchandises avaient pu franchir le cordon aussi facilement que les sacs de la poste.

Malgré toutes ces diligences certains médicaments et notamment les désinfectants faisaient absolument défaut en ville.

L'assistance médicale manquait aussi à plusieurs malades.

Le 28 Juin, en fait de médecins du Gouvernement en dehors du Dr. Winckler, Médecin-



en-chef de la province, absorbé particulièrement par les devoirs de sa charge, la ville ne possédait que le Dr. Noshi Effendi, celui-ci bien connu pour sa répugnance à approcher des malades et même à entrer dans leur chambre, et le Dr. Ibrahim Effendi Fakhri, envoyé expressément à l'occasion de l'épidémie, lequel avait simulé une maladie pour se soustraire aux devoirs de sa charge.

En fait de médecins particuliers le Dr. Kaproulas était le seul qui se trouvait en ville pour prêter ses soins aux malades.

A l'hôpital il y avait très peu de médicaments et pas même de bouteilles pour les distribuer et s'en servir.

Le manque de médecins et de médicaments a été signalé le 28 Juin à son Altesse le Khédive dans une dépêche qui lui a été envoyée par son Excellence le Moudir.

Le lendemain est arrivé le Dr. Sedky Bey, envoyé comme Inspecteur Sanitaire et assisté de quelques médecins indigènes.

Mais l'exemple des Drs. Noshi et Fakhri avait jeté dans l'esprit de la population, notamment parmi les colonies étrangères, une certaine méfiance contre les médecins indigènes et partout en ville on souhaitait l'entrée de médecins Européens.

La suspension des approvisionnements jeta Mansourah dans la consternation. Le prix des denrées alimentaires s'éleva considérablement.

Cet ensemble de circonstances joint à la frayeur produite par les progrès rapides de l'épidémie et l'issue fatale dans la plupart des cas a excité chez la population une émotion bien légitime.

Il fallait absolument intéresser l'opinion publique au triste sort de notre pauvre ville et le premier à entrer en campagne fut Mr. Alfred Dale, lequel dès le 3 Juillet a commencé à lancer une série de dépêches d'abord à son autorité Consulaire, ensuite à plusieurs négociants d'Alexandrie.

Divers membres des différentes colonies étrangères en firent autant et bientôt la situation déplorable de Mansourah ne fut plus un mystère pour le Chef de l'État.

Le 10 Juillet les négociants d'Alexandrie répondant promptement à ces appels de secours, formèrent un Comité sur l'initiative de MM. Carver, Bell, et Goussio.

Les membres du Comité se rendirent auprès de Son Altesse le Khédive et après lui avoir signalé l'état de notre ville, obtinrent l'assurance formelle que les habitants de Mansourah seraient soulagés immédiatement.

Au retour de cette visite, Mr. Carver en informa Mr. Dale, au nom du Comité et l'invita à réunir les colonies étrangères dans le but de former à Mansourah un Sous-Comité.

Le 11 Juillet, Mr. Dale provoqua cette réunion, et ce jour même notre Comité a été constitué et il a commencé son œuvre.

Notre attention s'est d'abord portée sur les principales questions d'hygiène générale qui intéressent Mansourah.

L'état des cimetières, véritables foyers d'infection ; la manière de procéder au transport des cadavres et à leur inhumation ; l'état de malpropreté des quartiers et des maisons ; la dispersion dans la ville des eaux ayant servi au lavage des cadavres ; le détournement et la vente clandestine du linge et des effets des personnes mortes de la maladie épidémique ; la grande agglomération des bestiaux introduits dans la ville à mesure que l'épizootie se propageait à l'extérieur ; les bains et les lieux d'aisance des mosquées, construits contrairement à tout principe d'hygiène ; la corruption des eaux du Nil, lavoirs et abreuvoirs publics en même temps ; les rives du fleuve extraordinairement chargées de matières fécales ; les mares d'eau stagnante situées à proximité de quartiers populeux ; voilà en peu de mots les principales questions qui ont formé l'objet des travaux de notre Comité.

Dès le début de son fonctionnement, le Comité a eu occasion de constater le zèle intelligent et dévoué de son Excellence Mohamed Zeki Pacha, le Moudir, et de son Excellence Mohamed Bey Sedky, l'Inspecteur Sanitaire.

La conduite de ces dignes fonctionnaires est au-dessus de tout éloge ; mais malheureusement ils avaient à lutter contre toutes sortes de difficultés ; d'abord les lenteurs provenant de la routine administrative et de l'apathie d'une grande, sinon de la plus grande partie des employés subalternes ; ensuite les obstacles créés à tout instant par l'opposition systématique et opiniâtre de la population indigène excitée par les Notables à combattre les mesures sanitaires.

C'est ici que l'action de notre Comité appuyé par celui d'Alexandrie a produit un effet salutaire.

Un seul fait suffirait à légitimer l'existence du Comité et à rendre méritoire aux yeux du public son action. Ce fait est celui-ci : depuis cinq ans les Administrations Gouvernementales discutaient la question des cimetières, tous mal placés et bondés de cadavres. Mais l'action du Gouvernement et le bon vouloir de quelques-uns parmi ses fonction-

naires étaient toujours allés se briser contre le mauvais vouloir des autres et les intrigues des particuliers intéressés à maintenir l'état actuel des choses. Eh bien, ce que le Gouvernement n'a pas pu effectuer au cours de cinq années a été accompli maintenant en peu de jours, grâce à l'action collective de notre Comité et de celui d'Alexandrie. Toutes les résistances ont été enlevées. Les anciens cimetières ont été condamnés à tout jamais et les nouveaux cimetières ont été établis en dehors et au sud-est de la ville.

Cependant il est triste de devoir constater que contrairement aux recommandations du Comité et de ses médecins et contrairement aussi aux assurances données par l'Inspecteur Sanitaire à ce sujet, les nouveaux cimetières ont été installés comme les anciens en dépit du bon sens. On ne s'est pas préoccupé de destiner une partie spéciale des cimetières aux personnes mortes de la maladie épidémique.

Les fosses ont été creusées à moins d'un mètre de profondeur, quoique la nature du terrain dans cette localité permette de creuser sans inconvénient jusqu'à la profondeur de deux mètres. Dans la partie destinée aux Musulmans, les caveaux construits pour recevoir de quatre à sept cadavres, sont comme par le passé ouverts et réouverts jusqu'à ce qu'ils soient remplis. La construction est des plus défectueuses et les miasmes délétérés qui s'en échappent sont un danger permanent pour la salubrité publique.

Les infirmiers que le Comité a constamment maintenus au cimetière pour contrôler le nombre des cadavres et la façon dont il était procédé à l'inhumation ont pu constater que certaines fois le nombre des cadavres transportés aux nouveaux cimetières était inférieur au nombre des décès déclarés à la Préfecture de Police.

Ce fait corrobore singulièrement le bruit que chacun de nous a entendu courir en ville, qu'il y avait eu des morts ensevelis dans les anciens cimetières après que la fermeture en avait été ordonnée et même des morts ensevelis dans l'intérieur des maisons.

Ces infirmiers par suite d'un accord avec l'Inspecteur Sanitaire devaient recevoir les effets personnels des morts pour les faire brûler et en donner quittance aux Cheiks-el-Hara, lesquels à leur tour devaient représenter à la Zaptieh un nombre de quittances égale à celui des morts de leurs quartiers respectifs. Mais nos infirmiers n'ont jamais rien reçu et il est notoire que les Cheiks-el-Hara s'emparaient des effets des défunts qu'ils vendaient ensuite clandestinement.

En ce qui concerne l'assainissement de la ville nous avons tous constaté que les fonctionnaires qui en étaient chargés ne disposaient pas en général des moyens nécessaires, et qu'ils se contentaient d'un semblant d'exécution, lorsqu'ils ne négligeaient pas totalement leurs devoirs. Nous faisons toutefois une exception formelle pour le pharmacien Mohamed Effendi Fettouh, lequel a vaillamment fait son devoir.

Sayb Bey, employé au Ministère des Finances, s'est offert spontanément et il a rendu des services signalés en surveillant l'exécution des mesures de propreté et de désinfection.

Les membres que le Comité a délégués pour la visite des quartiers n'ont jamais pu rencontrer à leur poste ni le Cheikh-el-Hara, ni un Maoun quelconque, ni le médecin indigène à ce destiné par l'Inspecteur Sanitaire. Aussi ont-ils été empêchés de s'introduire dans les maisons des quartiers indigènes les plus malpropres, comme ils en avaient l'intention pour faire exécuter par l'exemple, les bonnes paroles et à l'aide de secours, si besoin en était, les mesures de propreté qui doivent occuper le premier rang dans l'éducation populaire.

Les seules maisons peut-être qui ont été sérieusement assainies à titre de précaution ou désinfectées après quelques décès sont celles habitées par les colonies étrangères, avec l'assistance des médecins et des infirmiers du Comité.

Heureusement là où les mesures d'assainissement ont fait défaut, la température favorable et la crue du Nil ont contribué à la décroissance de la maladie qui a disparu de notre ville.

Dès que l'épidémie est entrée dans la période de décroissance, une partie des médecins et des infirmiers du Comité ont pu être expédiés successivement à Samanoud, Mehallet, et Benha, avec une provision de médicaments.

En dehors des mesures générales d'hygiène, le Comité a cru devoir porter secours aux indigents. Outre les médicaments distribués gratuitement, des sommes ont été confiées aux Présidents des communautés religieuses pour être distribuées parmi les pauvres.

Le Comité s'est décidé à cette mesure après avoir ouvert une souscription parmi les colonies étrangères de Mansourah; le produit est venu s'ajouter aux secours reçus du Comité d'Alexandrie.

Après la disparition de l'épidémie à Mansourah, les travaux du Comité peuvent se porter désormais avec plus de persistance sur l'étude de tout ce qui se rattache à l'hygiène publique.

Il ne faut pas se le dissimuler, la situation de l'Égypte, au point de vue sanitaire, est telle qu'elle doit inspirer les plus vives appréhensions pour l'avenir.



Le manque d'égouts, la mauvaise qualité de l'eau potable, le mode de sépulture, le non enfouissement des bestiaux qui meurent de l'épizootie sont des dangers constants.

Il est de notre devoir, Messieurs, d'envisager froidement la situation et de rechercher les moyens de prévenir la continuation de l'épidémie, et l'éclosion peut-être d'une autre épidémie bien plus terrible.

C'est dans ce sens que doit s'exercer désormais votre action.

Vous porterez votre action sur l'urgence d'établir à Mansourah et dans les principales localités de l'Égypte des établissements fournissant à des prix modérés de l'eau purifiée et, s'il le faut, désinfectée.

Vous vous persuaderez encore de la nécessité absolue d'établir des municipalités mixtes jouissant de la liberté voulue d'action et appelées à mettre en application les vrais principes d'hygiène.

Vous aurez à vaincre, ne vous le dissimulez pas, de grandes difficultés dans votre mission philanthropique, mais vous aurez—quelle que soit la réussite—la conscience d'avoir rempli votre devoir de citoyen.

Les Membres Délégués,

(Signé)

DE BINCKHORST.

H. MANUSARDI.

No. 4.

*Mr. Burrell to Earl Granville.—(Received November 6.)*

My Lord,

*Alexandria, October 27, 1883.*

I HAVE the honour to transmit to your Lordship, in compliance with instructions from Sir Evelyn Baring, a copy of my despatch of the 25th instant, relative to a visit I paid to the Governor of Alexandria with reference to the fresh development of cholera in the town, and the advisability of his Excellency's taking measures to reassure the public.

I have, &c.

(Signed)

W. PALFREY BURRELL.

Inclosure in No. 4.

*Mr. Burrell to Sir E. Baring.*

Sir,

*Alexandria, October 25, 1883.*

I HAVE the honour to state that the Italian Consul called on me yesterday to know what I thought of the gradual development of cholera in the last few days, and whether I intended taking any steps with regard to it.

I informed him that I had determined to call on the Governor of Alexandria after consulting my colleagues to ask him to do all in his power to reassure public opinion.

I saw my colleagues of France, Greece, Denmark, who had been on the Sanitary Commission during the worst period of the cholera, and they all approved of my proposed action, and begged to assure me that though they had had more than enough work previously, they were ready if called upon by the Governor to give him every assistance.

In the afternoon I called, accompanied by the Italian Consul, on his Excellency Osman Orphy Pasha, and after some conversation he begged us to accompany him through the worst quarters of the town. For nearly two hours we drove and walked through these different quarters, and so far as their external appearance went we were surprised at the clean state in which they were.

I also visited the place where a Maltese had died in the morning, and externally everything was clean.

Should it be the case that the Governor's hands want strengthening, as I believe is the case, I shall have the honour of telegraphing to ask your kind intervention with the Egyptian Government.

I have, &c.

(Signed)

W. PALFREY BURRELL.

## No. 5.

*Sir E. Baring to Earl Granville.—(Received November 9.)*

My Lord,

Cairo, October 25, 1883.

MY attention was recently drawn to a communication which Salem Pasha, the President of the Egyptian Board of Health, caused to be made to the "Egyptian Gazette."

I inclose a copy of Salem Pasha's letter and its inclosure.

After reading this letter, I called on Chérif Pasha, and pointed out to him that it was couched in unbecoming language, that Salem Pasha and his colleagues are quite at liberty to entertain any opinions they chose as regards the origin of cholera in Egypt, but that in expressing their disagreement with so distinguished an officer as Surgeon-General Hunter, who had been sent in an official capacity to Egypt by Her Majesty's Government, they must be made to keep within the bounds of courteous and respectful language.

His Excellency entirely concurred with my view of the case.

Salem Pasha has now addressed a letter of apology to the "Egyptian Gazette."

Under these circumstances I do not think that any further notice need be taken of Salem Pasha's conduct.

Your Lordship may perhaps think it desirable to forward a copy of this correspondence to Surgeon-General Hunter.

I have, &c.  
(Signed) E. BARING.

Inclosure in No. 5.

*Extract from the "Egyptian Gazette" of October 22, 1883.*

THE CHOLERA.—We publish the following translation of an official communication with which we have been favoured by the Board of Health:—

"Sir,

"Cairo, October 21, 1883.

"I beg of you to be good enough to insert in the next number of your paper the following communication from the Board of Health, in reply to the letter from Surgeon-General Hunter which you reproduced in your last issue.

"Thanking you, I am, &c.

"The President,  
(Signed) "DR. SALEM.

"Mr. A. V. Philip,

"Editor of the 'Egyptian Gazette.'

*"The Board of Health.*

"The Board of Health, having knowledge of the letter emanating from Surgeon-General Hunter, and reproduced in the "Egyptian Gazette" of the 19th October, 1883, finds itself obliged to protest energetically against the assertions contained in it, assertions tending to mislead public opinion and to cause it to be believed that cholera has been endemic in Egypt since the year 1865.

"The Board of Health declares—

"1. That Surgeon-General Hunter has never been in a position, during his short journey in some localities of Lower Egypt, to make personal observations which could authorize him to pronounce an opinion of the nature emitted by him in his letter, and that it is perfectly established that the information collected by him during his journey was obtained from persons absolutely ignorant of medicine.

"2. That Drs. Sonsino, Ambron, and Sierra, according to the statements made by them to the Board of Health, affirm the contrary, and, according to them, cholera has never existed in an endemic form in Egypt."



No. 6.

*Lord E. Fitzmaurice to Consul Cookson.*

Sir, *Foreign Office, November 9, 1883.*  
 I AM directed by Earl Granville to inform you that his Lordship approves Mr. Burrell's proceedings as reported in his despatch of the 27th ultimo, respecting the fresh development of cholera at Alexandria.

I am, &c.  
 (Signed) EDMOND FITZMAURICE.

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No. 7.

*Sir E. Baring to Earl Granville.—(Received November 22.)*

My Lord, *Cairo, November 12, 1883.*  
 I HAVE the honour to forward herewith a Report on the causes of the fresh outbreak of cholera at Alexandria, which has been drawn up by Dr. Gilbert Kirker, M.D., Surgeon of Her Majesty's ship "Iris."

Captain Rice informs me that Dr. Kirker has paid considerable attention to the subject, and has already contributed several papers for Dr. Hunter's information.

I have, &c.  
 (Signed) E. BARING.

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Inclosure in No. 7.

*Report by Dr. G. Kirker on the Cause of the Outbreak of Cholera at Chatby, Alexandria.*

ON the morning of the 18th October it was announced that seven cases of cholera, four of which had proved fatal, had occurred in the village of Chatby. For a period of nine days there had been no cholera in Alexandria, and until that time Chatby had entirely escaped. All the attacks except two were in women, and all those who were women. During the previous eight days, from ordinary diseases there had been eight deaths in the village, among a population of 2,000. The same afternoon the part of the village was evacuated. After that only three deaths occurred among the people of Chatby, and these were ill on the day of the evacuation.

On the day on which the outbreak of cholera was announced—which would be one or two days, at least, after the disease began—some people were attacked in Alexandria itself, and the number gradually increased, until, in the twenty-four hours ending 8 A.M., October 24th, nine deaths were registered. These were distributed very equally over the different quarters of the town.

This particular outbreak of cholera has offered a most favourable opportunity for an investigation as to the cause of the disease. The place is small, and the surroundings in which the people lived are easily seen. Only an isolated portion of the village was attacked; and, at this time, the cause in question seems to have acted in a powerful manner, since, during the whole course of the epidemic, from the first cases at Damietta to the last at Alexandria, until then cholera never entered Chatby.

The village of Chatby is on the coast, about a quarter of a mile to the north-east of Alexandria. Its site is a wide semi-circular depression in the sand-hills and rubbish-heaps, which extend to Ramleh. The depression is open towards the sea; its sides, landward, slope down from a greatest elevation of about 60 feet, and its bottom is only a little above the sea level. Thus the village has only a wind-exposure seaward, and this merely from north-north-east round by north to west-north-west. In all other directions it is sheltered, especially towards the south, where the elevated ground at the edge of the depression is about 50 feet high, while further back are groves of tall palm trees and houses.

Through the depression from south-east to north-west there runs a small canal. The water in it comes from the deep ditch by the eastern wall of the town, and is thought to be derived, by a subterranean communication, from the small Turkha Canal, which brings water from the Mahmoudceyeh. The banks of the canal, where it enters the depression, are about 50 feet high, and in its course through the lower flat ground they sink to 10 feet and less. The current is sufficient to keep the water from stagnating. The canal is used

by the villagers as Egyptians use all fresh-water canals. They wash their clothes and bathe themselves in it, they defecate and religiously cleanse themselves by the edge of its stream, and they carry its waters into their houses for drinking.

There are in the village two fountains belonging to the Alexandria Water Company. From one of these the water-carriers draw their water, and pay a certain sum for the right; the other is a free fountain for the poor.

Round the site of the village are several cemeteries. On the slope of the depression towards the south-south-west is the small Jewish cemetery; it has an elevation of from 30 to 40 feet, is close to one part of the village, and its shortest distance from the canal is about 240 yards. To the east-south-east are the Christian cemeteries, which have an elevation of about 60 feet. They are about 300 yards from the nearest houses, and 100 yards, at the shortest distance, from the ditch of the fortifications, from which the canal water comes. The Arab cemetery is a very long distance towards the north-east.

The village of Chatby is made up of four isolated portions. I shall describe these in an order depending on their situation with reference to the canal, and begin at its south-eastern end. On the right bank, a little below where the ground begins to fall, there is a small collection of houses. Its greatest extent is parallel with the canal, and in the opposite direction it is only three or four houses deep. The houses are not very close together; many of them are two-storied; and, as a whole, this portion of the village is well exposed to the wind. These dwellings, however, are nearest to the Christian cemeteries, and furthest from the fountains of the Water Company.

The second portion is about 100 yards back from the left bank, half-way down the slope of the depression, and is much larger than the first. Its greatest extent is at right angles to the canal, and by streets running in this direction; it is divided into long blocks, which are only one or two houses deep. Most of the houses are two-storied, and this portion of the village seems to be inhabited by a more well-to-do class of people than the other three. The Jewish cemetery is close to one side of it.

About 70 yards further, after crossing a railway embankment, which is 10 feet or so high, the third portion is reached. It occupies both banks of the canal, the larger moiety being on the right. Its houses are very small, nearly all of them are of one tiny storey, about 6 feet high, and they are built together into irregular solid masses. Between the different house-masses are the narrow, tortuous passages which serve for streets. Of all the houses in Chatby these have the lowest site, being even overtopped and sheltered by the railway embankment close to. Looking at them from that standpoint, they seem to form two large flat masses of mortar separated by the canal. At this point the banks of the canal are about 10 feet deep; 100 yards further it enters the sea. On the shore, a few yards from the left bank, is a large tannery. This third portion of the village was the scene of the outbreak of cholera.

The fourth portion is a very small one, about 100 yards to the north-east of the third. It stands on more elevated ground than the latter, but the houses of both have the same character. About 100 yards to the north-east of this portion are the abattoir and Government tannery.

With regard to the houses of Chatby in general, they are all built of stone and lime, and are one or two stories high. The two-storied, and some of the one-storied, have one door and several windows. Most frequently, however, the latter, besides a small door, have only a couple of holes about 6 inches square, which perforate the upper part of the front wall. The dimensions of a one-storied house would be about 10 feet long, 8 feet wide, and 6 feet high. They have flat roofs and no chimneys, and they are carefully plastered over with mortar, and white-washed. The interiors of these houses I have not seen, but no doubt, in their internal arrangements and condition, they resemble the houses of all Egyptian villagers.

Several theories as to the causation of the outbreak of cholera at Chatby have been already formed. That of Dr. Ahmed Bey Hamdy, who was sent by the Minister of the Interior to inquire into this subject, is that the germ of the disease has been propagated by the tanneries mentioned above ("Egyptian Gazette," 29th October). This theory appears to me to be wrong, for two reasons. In the first place, it is not proved that such animal effluvia, no matter how disagreeable to the smell, when diluted with the free atmosphere, are injurious to health; in fact, the opinion of those who have paid attention to the matter inclines rather to a denial of this. I have also made a cursory inspection of that one of the two existing tanneries, which is nearer to the village. It is situated on the edge of the sea, and is very well ventilated. There is a very disagreeable smell from the hides undergoing the early processes of tanning, but it is hardly reasonable to think that the effluvia would propagate germs, which would attack, especially, women in houses 100 yards off, while they passed over the workers in the tannery. In the second place, the



wind, for several months during the summer, blew the smell of the tanneries toward the village, which remained exceptionally free from cholera, but after a month, in which the direction of the wind was generally opposite, the disease appeared.

Another theory, which also assumes the germ-production of the disease, supposes that the cause has been the specific microbe which found its way into the canal, being washed by rain from the bodies of the cholera victims in the neighbouring cemeteries. Without considering whether there is or not a cholera-producing germ buried with the cholera dead, the supposed route by which, in this case, it attacked the living, is impossible. The elevation of the cemeteries above the subsoil water is from 20 to 50 feet; and the distance of the Jewish, which is the lowest from the canal, is about 240 yards; and of the Christian, which is the highest, about 100 yards. On the afternoon of the 9th October there were one or two light showers of rain, and a short (not very heavy) one on the morning of the 10th. It is, therefore, absolutely impossible that this small quantity of water could have percolated that depth and distance through dry land and ancient city rubbish. It could only have descended a few inches, and could not have reached even the bodies in the graves.

A third theory states that the emanations from the cemeteries may have been the cause. It is not, however, asserted that these emanations existed, and, at any rate, on the day after the outbreak, they were not perceptible.

According to a fourth, the disease arose from accumulations of night-soil and refuse on the beach opposite the village. I have inspected this beach, and found nothing but collections of seaweed.

The opinion which I formed after looking at Chatby and its surroundings was, that the outbreak of cholera there at that time was due to the influence of the weather, which had just passed. It appeared to me that the freedom from the disease, which the village had enjoyed until then, though it was in constant and full communication with Alexandria, where the epidemic existed, was owing to the sea-breeze during the summer constantly blowing from the direction in which it is exposed.

On the 19th September the prevalence of the north-westerly summer winds was broken. Then followed a period of variable winds, the easterly and southerly ones being the most frequent. The rain on the 9th and 10th October may be taken as marking the termination of this period and the starting-point of another. In the second, from the night of the 10th to the night of the 15th October, the wind, which was nearly always light, varied from east to west only round by south; frequently at night there was no wind at all, and the temperature rose from a maximum of  $70^{\circ}$  on the 10th to  $84^{\circ}$  on the 15th. On the 16th the wind was northward, and there was a fall in temperature. During both periods the relative humidity of the atmosphere was not very great, the mean in each case being  $80^{\circ}$  at 9.30 A.M. and  $82^{\circ}$  at 11 P.M.

At 8 A.M. on the 18th four deaths and seven attacks of cholera were reported from Chatby, and it is probable that the disease began on the 15th or 16th.

Now, I believe that the stagnancy of the air over Chatby, owing much to its low and sheltered position, especially during the period from the 10th to the 15th October, forced the disease into existence; and that the influence of the motionless atmosphere was probably assisted by the rise in temperature, and by the moisture of the ground following the rain on the 9th and 10th.

In giving to meteorological conditions this high influence in the causation of the outbreak of cholera at Chatby, it may be necessary to state that, by themselves, I do not deem them all-sufficient; they constitute, however, what may be called the governing or exciting condition. Many unsanitary conditions surrounded the people in the village, especially in that portion which was attacked. It is situated the lowest, and its houses are the smallest, most badly ventilated, and most closely built together. There is, however, no evidence that any of these unsanitary surroundings were intensified at the time in question. Again, the fact that the disease reappeared in Alexandria, at or near the time it more violently struck Chatby, points to a common exciting condition, such as the weather, and discredits the theories of mere local causation, such as proximity of the tanneries or cemeteries.

In connection with the prevention of cholera, as meteorological conditions are almost beyond human control, attention must be given to improving the local sanitary surroundings of the people. In these matters, at present, the Egyptians are left unadvised and undirected; and considerations of convenience licensed by ignorance govern their lives. At very little cost much might be done in the desired direction. Thus, to prevent the people building their houses of too small a size, or too closely together, or in a bad situation, would require very little outlay.

In conclusion, it is important to point out, in connection with the question of

quarantine, that though Chatby was for months in constant and full communication with cholera-stricken Alexandria, it remained unaffected, and when it suffered Alexandria had been free for nine days.

"Iris," October 31, 1883.

(Signed)

GILBERT KIRKER, M.D.,  
Surgeon, R.N.

No. 8.

*Sir E. Baring to Earl Granville.—(Received December 7.)*

My Lord,

Cairo, November 26, 1883.

I HAVE the honour to forward a copy of the report of the Commission lately sitting at Alexandria to inquire into the causes of the recent outbreak of cholera there, and also a copy of a Minute written by Mr. Clifford Lloyd on the subject.

I have, &c.

(Signed) E. BARING.

Inclosure 1 in No. 8.

*Report of Special Sanitary Commission at Alexandria.*

LA Commission Spéciale Sanitaire présidée par son Excellence le Gouverneur d'Alexandrie, chargée de rechercher les causes qui auraient pu contribuer à la réapparition du choléra, afin de prendre les mesures nécessaires pour l'étouffer, a tenu sa première séance le 25 Octobre, 1883, à 10 heures du matin, dans le local même du Gouvernement.

Il a été décidé que MM. les membres se partageassent la ville, et la visitassent minutieusement dans toutes ses parties afin de se fixer sur les causes :—

1<sup>er</sup> et 2<sup>e</sup> quartiers, Drs. Ahmed Hamdy et Schiess Bey.

3<sup>e</sup> et 4<sup>e</sup> quartiers, Drs. Varenhorst Bey et Mahmoud Sidky Bey.

5<sup>e</sup> quartier (Ramleh), Dr. Freda Bey.

Après une inspection minutieuse, les Soussignés ont eu l'honneur de présenter leurs observations verbalement sur ce qu'ils ont constaté en ville dans la deuxième séance tenue le 27 Octobre, à 5 heures soir. Il a été décidé de formuler le résultat de la mission de chacun sous forme de Rapport, et c'est ce Rapport que les Soussignés ont l'honneur de présenter aujourd'hui :—

1. En général les places publiques, boulevards, rues, et ruelles de la ville, ont été trouvés dans un état de propreté satisfaisant.

2. La plupart des mosquées de la ville ont été trouvées propres, néanmoins dans quelques-unes les latrines et "maghtas" ont été trouvés dans un état peu satisfaisant sous le rapport de la propreté, et il a été remédié immédiatement; nous avons recommandé le lavage et la désinfection journalier, ainsi que le renouvellement de l'eau servant aux ablutions, sinon journellement, du moins une fois tous les deux jours. Son Excellence le Gouverneur, Président de notre Commission, toujours prêt à faire exécuter immédiatement toutes les mesures hygiéniques dans l'intérêt de la santé publique, a déjà donné des ordres sévères et précis pour que les latrines soient pourvues de cuvettes; et nous avons la satisfaction de constater que déjà des mosquées en sont munies; nous verrons bientôt les autres propriétaires ou Directeurs de mosquées suivre le même exemple, des ordres en conséquence ayant été renouvelés pour presser cette opération.

3. Les matières employées comme combustibles dans les bains publics ont été trouvées composées comme d'habitude de substances végétales et détritiques de matières animales ne présentant pas un degré de sécheresse suffisant, et répandant dans quelques bains une odeur fétide. Cet inconvénient a été éliminé par les soins de son Excellence le Gouverneur, qui a fait enlever ces matières et a prescrit de ne pas permettre l'entrée dans ces établissements que la quantité de matières végétales sèches nécessaire au chauffage d'un seul jour.

4. Les égouts de la ville ont été trouvés dans de mauvaises conditions de salubrité et d'hygiène publiques; ils laissent dégager une mauvaise odeur qui infectait l'atmosphère à cause des défauts qu'ils présentent et qui seront indiquées dans les conclusions de ce Rapport.

Le curage et la désinfection sont des mesures urgentes à prendre pour empêcher la recrudescence de la maladie en ville. Son Excellence le Gouverneur, dont l'attention avait été attiré pour cet inconvénient, avait délibéré à ce sujet avec la Commission de



Commerce, qui a fixé un crédit de 400L. pour l'exécution de ce travail, qui avait déjà commencé six jours avant la formation de la Commission.

Cet inconvénient pouvait être un grand danger à la salubrité publique, surtout dans une ville comme Alexandrie, qui est encore contaminée, puisque le temps qui s'est écoulé depuis le cas constaté le 7 Octobre à l'Hôpital Prussien, jusqu'aux quatre cas constaté à Chatbi, le 17 du même mois, n'était point suffisant pour que l'on puisse affirmer d'une manière absolue que le choléra avait complètement disparu de la ville. Tout ce qu'on peut avancer c'est que le germe cholérique et par suite la maladie elle-même existait toujours à l'état latent.

5. Les urinoires nouvellement installés, quoique en grand nombre en ville, ne sont pas construits de manière à faciliter l'écoulement des urines, soit par suite du bouchage de leurs conduits, soit qu'il ne communiquent pas tous avec l'égout de la voie publique. Tous manquent d'eau pour leur nettoyage, et il faudrait remédier immédiatement aux inconvénients qui en résultent en désignant un personnel spécial préposé exclusivement à leur nettoyage et leur désinfection journaliers, sauf à procéder ultérieurement au creusement de conduits pour l'écoulement des eaux et des urines. Son Excellence le Gouverneur d'abord, et l'Administration de la Voirie ensuite, ont affecté à ce service un personnel spécial.

6. A Chatbi se trouvent des tanneries sur le bord du canal, et parmi les habitations renfermant des bassins d'un liquide exhalant des odeurs putrides, et des peaux fraîches, dont l'odeur se répand à une grande distance. Ces peaux sont lavées dans le canal même. Il est de toute nécessité de faire déplacer ces tanneries, faire désinfecter leur emplacement, et les installer loin des habitations.

7. Les Bazars ont été trouvés dans des conditions assez satisfaisantes, néanmoins les conduits d'eau auraient besoin d'être nettoyés et désinfectés, et faire en sorte que l'écoulement des liquides sales se fasse sans obstacles.

8. Les cabanes de Ras-et-Teen, appartenant à l'Administration des Wakfs, doivent être l'objet d'une surveillance toute spéciale et active de la part des autorités sanitaires et administratives, vu l'agglomération des habitants en ces lieux. Après notre inspection il a été donné des ordres précis pour le badigeonnage à la chaux intérieurement et extérieurement, et aujourd'hui nous avons constaté avec satisfaction que cette opération a commencée et sera continuée. On a recommandé aux habitants de tenir leurs cabanes dans un état de propreté constante; car si, par hasard, l'épidémie venait à faire son apparition dans ces parages, elle aurait certainement beaucoup de violence, et sévirait fortement parmi ces malheureux. De plus, son Excellence le Gouverneur a donné des ordres à l'Administration des Wakfs pour procéder à la destruction et à la démolition des cabanes en ruine, ou dont les conditions hygiéniques seraient mauvaises.

9. Les mêmes mesures sont étendues aux autres cabanes et huttes de la ville, qui sont pour la plupart dans les mêmes conditions que celles de Ras-et-Teen. Il est aussi de toute urgence de faire installer un grand nombre de latrines en maçonnerie pour que les habitants ne puissent pas faire leurs besoins en plein air.

10. Les écuries publiques doivent être surveillées rigoureusement. On doit obliger les propriétaires à les maintenir constamment propres, et enlever le fumier au fur et à mesure pour en prévenir la fermentation; on doit de plus les faire désinfecter et blanchir à la chaux.

11. Les sardines fraîches, dont on fait une grande consommation, doivent être interdites provisoirement, puisqu'il serait impossible d'en interdire la vente d'une manière permanente.

Le marché aux poissons doit être constamment surveillé pour en assurer la propreté constante et la bonne qualité des poissons, qui s'y vendent tous les jours en très grande quantité; les poissons qui seraient trouvés gâtés, ou de mauvaise qualité, devront être immédiatement détruits.

#### *Conclusion.*

Nous croyons devoir conclure d'après ce qui précède, d'après nos appréciations personnelles, et des faits qui sont parvenus à notre connaissance, que le germe cholérique à Alexandrie n'avait jamais cessé d'exister depuis le 7 Octobre, 1883, et qu'il était seulement à l'état latent pendant tout ce temps; que lorsque, par des causes quelconques, il a trouvé un milieu favorable à la propagation et à sa multiplication, la maladie a éclaté à Chatbi, qui était resté quasi-indemne jusqu'au 17 Octobre, puisqu'on n'y avait constaté qu'un seul cas longtemps avant cette date.

Parmi les causes qui ont favorisé le développement du germe cholérique déjà existant depuis le commencement de l'épidémie dans la ville d'Alexandrie, cette année courante, nous citerons les nombreuses tanneries de Chatbi qui laissent dégager pendant les premières

opérations du tannage des émanations putrides très fortes senties à une grande distance. L'usage de l'eau du canal dans la partie qui avoisine les tanneries, salie par le lavage des peaux fraîches et des linges sales des habitants pourrait être considéré comme ayant contribué aussi au développement du choléra.

MM. les Drs. Varenhorst Bey et Schiess Bey s'inclinent à ne pas exclure complètement de ces causes l'infiltration des eaux des cimetières situés près la Porte Rosette à 40 mètres seulement du Canal de Chatbi. Cette infiltration était d'autant plus facile qu'il était tombé des pluies torrentielles qui pouvaient avoir entraîné les germes des cadavres des cholériques qui s'y trouvaient enterrés.

Quant à l'apparition de la maladie en ville, nous ne pouvons l'attribuer qu'à la mauvaise canalisation de la ville dont le niveau est bas par rapport à la mer, ainsi qu'il résulte du Rapport de M. Dietrich, Ingénieur de la Commission de Commerce.

Nous attribuons donc la reprise du choléra parmi les Européens aux égouts mal nettoyés, à la difficulté de procéder à ce nettoyage à cause du mauvais système de canalisation, et une manque de ventilateurs, mais comme nous avons la satisfaction de le constater, nous ne tarderons pas à voir toutes ces causes plus ou moins probables disparaître complètement par le zèle, l'énergie, et le dévouement que ne cesse de déployer jour et nuit son Excellence le Gouverneur dans ces circonstances, et par suite, voir cesser enfin ce terrible fléau qui a justement ému les esprits par son apparent retour.

(Signé)

HAMDY BEY.  
M. SIDKY BEY.  
VARENHORST BEY.  
SCHIESS BEY.  
FREDA BEY.  
OSMAN ORPHI.

*Alexandrie, le 5 Novembre, 1883.*

#### Inclosure 2 in No. 8.

##### *Minute.*

WITHIN a few months of the warning given by the outbreak of cholera last summer, it is much to be regretted that such a Report should now be received from the Commission by which it is clearly demonstrated that although 3,723l. is spent annually on the sanitary inspection alone of Alexandria, the condition of the town is one most discreditable to those charged with the sanitary administration of this country.

The latrines are filthy and dangerous to health, the drains are choked, the fuel used in the public baths is simply propagating disease and death, the water being drunk by a portion of the people is infected with cholera germs or other impurities, the people in localities are dangerously overcrowded, the markets require supervision, &c.

These are the evils for the prevention of which the Conseil de Santé is responsible.

3,723l. is annually paid by the Government for inspection purposes at Alexandria to guard against them, and it should not be necessary for the Government to send a Commission to Alexandria in order to learn whether such dangers exist or not.

That these evils should have arisen shows that the Inspectors have failed in their first duties, and the Conseil de Santé cannot be exercising that surveillance over its subordinates provided for in the Decree, if the Inspectors can thus neglect their duty, leaving an outbreak of disease to give the first notice to the Government that they are doing nothing but draw their pay regularly.

The Egyptian Government has a right to demand honest service from its servants, high and low, and the Report of this Commission as well as my Report on the condition of Port Saïd, shows that such service has not been rendered by one or the other in the particular matters dealt with.

1. Under these circumstances, I think it desirable that a copy of this paper should be sent to the Conseil de Santé, in order that the Inspector may be called upon to report why he has thus neglected his duties, and if a satisfactory explanation is not received, he should be called upon to resign, and he should not be again employed.

2. That the Inspector at Alexandria be directed in future to send in to the Conseil de Santé through the Governor, a weekly Report of the daily duty he has performed each week. The Sanitary Inspector should each day make an inspection of some portion of the town and frequently visit the latrines, mosques, abattoirs, markets, public baths, &c.

3. That the Governor be requested to see the various immediate recommendations of



the Commission at once carried out and to report when they are completed, and also to report as to paragraph 7.

4. That the Governor should, in consultation with the Commandant of Police, divide the town in numerous quarters, and that officers of police should be named each week, one for each quarter, to inspect daily the latrines, abattoirs, public baths, markets, and the quarter generally, and to report through the Commandant of Police to the Governor whatever he may find unsatisfactory.

5. The Governor and the Commission should be thanked for the exertions they have made, and the energy they displayed.

(Signed) CLIFFORD LLOYD.

November 15, 1883.

No. 9.

*Lord Amphil to Earl Granville.—(Received December 10.)*

My Lord,

*Berlin, December 7, 1883.*

WITH reference to my despatch of the 16th October last, I have the honour to inclose an abstract (as published in the "Nord-Deutsche Allgemeine Zeitung" of yesterday morning) of a further Report, dated Suez, 10th November, drawn up by Dr. Koch, the Chief of the German Scientific Expedition which has been sent to Egypt to investigate into the origin of the cholera.

In this Report Dr. Koch states that in consequence of the rapid decrease of the cholera in Bombay the Commission propose, acting on the advice of several well-informed British officials, to go straight to Calcutta where they are more likely to find subjects for examination.

Dr. Koch states that the Commission visited Damietta with the object of discovering whether the recent cholera epidemic was imported there from India, or whether it was of indigenous growth, and promises a detailed Report on the subject.

Dr. Koch then proceeds to relate the steps taken by the Commission to examine into the Quarantine Regulations recently enforced in Egypt, and gives an account of their visit to Tor, El Wedj, and to the quarantine station at the Wells of Moses, near Suez. At Tor they were enabled to witness the debarkation of two shiploads of pilgrims from Djeddah, both batches being proved to be infected.

A further Report is promised on the question of the efficacy of these Quarantine Regulations in checking the importation of the epidemic by pilgrims on their way to and from Mecca.

Dr. Koch further states that fifty patients suffering from ophthalmia have been examined, and two distinct forms of that disease have been found.

Though the rinderpest is still prevalent in Lower Egypt, the Commission failed in their endeavours to obtain any infected animals, living or dead, for inspection.

The Report concludes by expressing the warm thanks of the Commission for the assistance rendered them by the Acting German Consul-General, by the members of the Egyptian Government, and most of all by His Highness the Khedive, for authorizing the visits paid by the Commission to the Egyptian quarantine stations.

I have, &c.

(Signed) AMPHILL.

Inclosure in No. 9.

*Report by Dr. Koch.*

(Translation.)

A FURTHER Report has been received from the Head of the German Scientific Commission sent to Egypt and India to investigate the nature and origin of the cholera. It is dated from Suez, the 10th November, 1883. Its contents, as far as they are of general interest, are here produced.

I have to report the following particulars respecting the work performed by the Commission since my last Report (dated Alexandria, the 17th September).

Notwithstanding that only scattered cases of cholera occurred, it happened fortunately that we were able to dissect the body of a patient who had died from cholera. The operations, which were conducted in the European Hospital, furnished the same results

with regard to the occurrence of bacilli in the mucous membrane of the intestines, as previous cases had afforded.

The intestinal contents of this body, as well as the other fluids previously collected from cholera patients and cholera corpses, were employed to continue the infection experiments under the most varied modifications. Thus it was attempted to set up infection in monkeys, dogs, mice, and fowls by direct injection, the injicienda being thrown up as far up as possible into the rectum of the animals under experiment; also by mixing the above-mentioned substances with earth or water, drying them on textile fabrics, and some time after introducing them into the food of the animals. All these experiments, however, like the previous ones, produced no result.

After these trials had been concluded and there was no reason to expect further opportunities of dissecting cholera corpses, the Commission proceeded on the 16th October to Cairo. The instruments, apparatus, and the whole of the pathological objects requisite for the continuance of our investigations were carefully packed and sent on ahead by goods service to Suez, so as to be overtaken there and conveyed with us on the remainder of the journey to India. During the stay of the Commission in Cairo a recrudescence of the epidemic was reported from Alexandria. A return to Alexandria, however, did not seem calculated to further the objects of the Commission, as there was no reason to think that the fresh outbreak of the malady would prove considerable in either extent or duration.

Dr. Schiess Bey and Dr. Kartulis, however, with the most thankworthy readiness to promote our labours, offered to collect further materials for dissection. This was done, and I have received from these gentlemen substances required for investigation from four more cholera corpses.

I had at first regarded Bombay as the locality in India best suited for the prosecution of our investigations, as numerous cases of death from cholera had occurred there during August and the first half of September. The epidemic has, however, since rapidly declined at that place, and has now, apparently, quite vanished. Under these circumstances Calcutta is, in the opinion of various English officers, well versed in Indian matters, the city best suited for the work of the Commission, as the cholera is always found there in more or less virulence. This information induced me to seek the sanction of your Excellency for the journey of the Commission to Calcutta.

Before the departure of the Commission from Egypt, however, I considered it indispensable to study very closely several questions which are of the greatest importance in warding off cholera.

The first question requiring attention, is whether the assertion is correct, which has been put forward on many sides and strenuously maintained, viz., that the epidemic of cholera this year in Egypt has not been imported from India, but that it broke out spontaneously in the country, and consequently, whether, in future Egypt, must be placed in the same category as India, with reference to the generation of this dangerous disease. With the purpose of arriving at a judgment upon this question the Commission left Alexandria on the 6th October for Damietta, where the epidemic began, and in this place instituted the most diligent inquiries respecting the origin of the disease.

The result of these inquiries I reserve for a detailed Report.

Far more important than this were the questions of the effectiveness of the quarantine and the communication of the cholera by pilgrims journeying to and from Mecca. These matters also occupied the attention of the Commission during its sojourn in Alexandria, and the quarantine arrangements at Gabbari and Mex, near Alexandria, as well as at the mouth of the western arm of the Nile, near Damietta, were also a subject of its investigations.

When, however, within the last few weeks, an outbreak of the cholera among the pilgrims in Mecca was reported, and a Regulation was issued obliging pilgrims coming from Djeddah to undergo quarantine in Tor, such a good opportunity seemed thus afforded for obtaining information on these important questions that I considered it incumbent upon me not to neglect it. But as no regular communication exists between the Egyptian quarantine places and the Red Sea, the only plan open to us was to apply to the Egyptian Government to enable us to visit the quarantine ports. In reply to a request from the German Consul-General, His Highness the Khedive at once placed the steamer "Damanhour," which was proceeding to Tor with equipments for the quarantine camp, at the service of the Commission for this purpose, and the offer was most gratefully accepted. At first the Commission had hoped to make this tour in such a way that, after visiting Tor and El Wedj it would have proceeded southwards along the Red Sea coast to Djeddah, and there joined a steamer belonging to one of the Indian lines. This, however, proved impracticable, as the Commission had to undergo a long quarantine in Djeddah, and had thereby lost too much time. It was obliged accordingly to return from El Wedj



to Suez, in order to embark for India. On the 30th October the Commission started from Cairo for Suez; on the 31st it set out for Tor, and thence, on the 2nd November, for El Wedj, and started on the 7th November at evening, back towards Suez, making another visit on its return journey to the quarantine camp of pilgrims at Tor, and finally inspecting the quarantine at Moses' Well, near Suez.

This excursion proved in the highest degree instructive for the Commission. It afforded an opportunity at their first visit of inspecting the quarantine camp prepared for, but not yet occupied by, the pilgrims. On that very day an Austrian Lloyds' steamer arrived with nearly 500 passengers at the port near Tor. According to the medical officer of the vessel, all on board were healthy. But during the disembarkation and transport of the pilgrims to the camp, at which the Commission was present, it became apparent that several of the pilgrims were seriously ill and suspected to be suffering from cholera, so that they had to be sent immediately to the quarantine lazaretto. At its second visit to Tor the Commission found that a second vessel full of pilgrims, who had already landed, had arrived. Meanwhile the cholera had broken out in both camps, and there had been among the first vessel-load of pilgrims three fatal cases, and among the second, one, and a number of cholera cases in proportion. At its visit to the lazaretto the Commission saw a cholera corpse and several patients who presented the characteristic symptoms of the disease. The Commission, moreover, strove, during its inspection of the quarantine establishments at El Wedj, Tor, the Moses' Well, and the sanitary establishment at Suez, to obtain a deep insight into the conditions of these institutions, upon which so much depends with regard to the conveyance of the cholera into Europe, and believes that its own investigations, as well as the information elicited from the quarantine officers and the pilgrims, have placed it in a position shortly to furnish your Excellency a reliable judgment founded upon its own observations on this question. It may further be mentioned that the Commission, on its return to Suez, together with its travelling baggage, had to undergo a disinfecting process.

Together with these investigations immediately concerned with the cholera, the Commission pushed on also its researches on allied questions, such as water supply and filtration, the influence of the rise and fall of the Nile upon the progress of the epidemic, the manner of interment, soilure of the ground by uncleanness in the matter of privies, &c.

Further, numerous dissections were conducted in Alexandria, and by this means valuable observations were collected upon dysentery and the occurrence of tuberculosis in Egypt, as also upon parasites which exist in the mesenteric vein (*Distomium hæmatobium*), and which are very frequently found in corpses in Egypt. An opportunity was also offered of observing other serious diseases occasioned by parasites (*Anchylostomum duodenale*, *Filaria sanguinis hominis*).

Further, nearly fifty patients suffering from Egyptian ophthalmia were examined, and it was found that under this name two distinct affections were included. One of these, which manifests greater virulence, is occasioned by a species of bacteria resembling the gonorrhæal micrococcus, and very probably is identical with it. In the second affection, which is less dangerous, very small bacilli are regularly found in the ulcerous corpuscles.

The cattle disease still continued to occur in Lower Egypt, although only in isolated cases. The Commission consequently made many efforts to form an independent judgment of this disease also. Unfortunately, all endeavours to obtain animals suffering from rinderpest, or their carcasses, proved fruitless.

While we are about to quit Egypt, I feel bound on behalf of the Commission to notice with the most grateful recognition the care and knowledge with which the representative of the Consul-General assisted the Commission on every occasion. The Egyptian Government, also, although it had at first little opportunity of aiding the Commission in the attainment of its objects, evinced a keen interest in the work of the Commission with respect to its researches into the origin of the cholera at Damietta, and the study of the quarantine establishments, and in every way promoted these labours by recommendations addressed to its officers.

But the Commission feels in a special manner obliged to His Highness the Khedive for having afforded it facilities for an undertaking of such utility as its visit to the Egyptian quarantine ports.

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No. 10.

*Sir E. Baring to Earl Granville.—(Received December 13.)*

My Lord,

Cairo, November 30, 1883.

I HAVE the honour to inclose copy of a letter addressed by the Minister of the Interior to Mr. Vice-Consul Borg expressing the acknowledgments of the Egyptian Government for the services which he rendered as a member of the Special Sanitary Commission during the prevalence of cholera in Cairo.

An identical letter has been received by Mr. Aranghy, interpreter to Her Majesty's Agency, who formed part of the Commission for the Shoubrah quarter.

I have, &c.  
(Signed) E. BARING.

Inclosure in No. 10.

*Khaïry Pasha to Vice-Consul Borg.*

(Translation.)

My dear and respected Mr. Borg,

Ministry of the Interior, October , 1883.

IN my letter to his Excellency the Prefect of Police, which was read at the last meeting of the Special Sanitary Commission, I have expressed the thanks of the Government of His Highness the Khedive in a general way for the assistance and diligence of all its members, but it is necessary that I should, in a particular manner, express thanks to you for the services rendered by you during the cholera epidemic. I therefore address these lines for that object, and also for expressing my own personal gratitude to you.

I am, &c.  
(Signed) AHMED KHAÏRY PASHA,  
Minister of the Interior.

No. 11.

*Earl Granville to Sir E. Baring.*

Sir,

Foreign Office, December 17, 1883.

I HAVE to acknowledge the receipt of your despatch dated the 30th ultimo, inclosing a copy of a letter addressed by the Egyptian Minister of the Interior to Mr. Vice-Consul Borg, conveying the acknowledgments of the Egyptian Government for the assistance which he rendered as a member of the Special Sanitary Commission during the prevalence of cholera in Cairo; a similar testimony being also, it appears, rendered to the services of Mr. Aranghy, Interpreter to Her Majesty's Agency.

I have now, in reply, to request that while expressing to the Egyptian Government the satisfaction with which Her Majesty's Government have learnt that the action of the above-mentioned officers has met with their approval, you will inform Messrs. Borg and Aranghy that Her Majesty's Government concur in the view which has been taken of their services by the Government of the Khedive.

I am, &c.  
(Signed) GRANVILLE.

No. 12.

*Surgeon-General Hunter to Lord E. Fitzmaurice.—(Received December 21.)*

My Lord,

21, Norfolk Crescent, Hyde Park, December 21, 1883.

I HAVE the honour to acknowledge the receipt of a despatch from Her Majesty's Agent and Consul-General at Cairo, dated the 26th November, 1883, with accompaniments, forwarded under cover of your Memorandum dated the 8th December, 1883, and regret exceedingly to find that the conservancy arrangements at Alexandria should have been allowed to fall into so disgraceful a condition.

I take the opportunity of forwarding, for the information of Earl Granville,



copies of two Memoranda, the originals of which I drew up after inspecting the city and waterworks, and dated respectively the 25th and 31st August, 1883.

The Memorandum on the sanitary condition of the city exposes evils of a serious and grave character, highly dangerous to the public health, and requiring to be dealt with as early as practicable.

The question of having the outlet of the sewers at Fort Ada is one of primary importance, and would mainly depend on the existence, or otherwise, of a current setting in towards the shore. This should be determined by a series of carefully conducted float experiments, and if it was found no inshore current existed, the evidence should be regarded as conclusive in favour of the scheme.

The good quality of the water supply cannot fail to be a source of satisfaction to the inhabitants.

The quantity daily supplied is hardly sufficient, and should be increased to 25 gallons per head of the population. The distribution, too, would seem to be defective. On this point, however, Mr. Cornish, from his knowledge of local requirements, must be considered a better authority than myself.

The collection of huts on the banks of the Company's canal ought to be removed without hesitation or delay.

I have, &c.  
(Signed) W. G. HUNTER.

Inclosure 1 in No. 12.

*Memorandum.*

I INSPECTED the waterworks on the morning of the 23rd instant.

An English Company, under the management of Mr. J. E. Cornish, C.E., C.M.G., who supplied me with every information in his power.

The water supply is obtained from the Mahmoudieh Canal, through a small private cutting or canal connecting it with the pumping-station, which is situated just outside the Rosetta Gate.

On the banks of the private canal are two Arab villages, which are beyond the control of the Company's watchmen, and in consequence the water is polluted by them.

The filtration by gravel and sand is very carefully and ingeniously conducted.

The quality of the water supplied is very good, as shown on analyses made by Mr. Ludwig. The quantity supplied amounts to 20 gallons per individual per day. Only one-third of this quantity is laid on to the houses, the other two-thirds being obtained from the stand-pipes and taps in the streets.

The Company sell the water to the water-carriers at so much per goatskin-full, and find this arrangement works more satisfactorily than letting the stand-pipes to contractors. The Government pay 6,000*l.* per annum for the water supplied for public and municipal purposes.

The Ramleh Waterworks, though belonging to the same Company, are a distinct and separate branch. The water supplied is not filtered, as it is chiefly used for irrigation purposes; filtration, for drinking purposes, being left to the inhabitants themselves.

*Alexandria, August 25, 1883.*

Inclosure 2 in No. 12.

*Memorandum on the Sanitary State of Alexandria.*

THE Committee brought into existence during the epidemic have done much to improve the sanitary condition of the city, especially as regards surface cleansing, but, as in Cairo, a vast field for sanitary work has yet to be entered upon. Generally speaking, the sewerage of the city is very defective, and the houses even in the best part of the town are in direct communication with the sewers and cesspits. There are no public latrines except those belonging to the mosques, which are quite inadequate to meet the wants of the people, and they are

in a filthy condition. The city for Sanitary Administration purposes has been divided into four quarters and allotted among the members of the Committee.

Quarter No. 1. Ras-el-Tin, on the narrow neck of land which ends at the lighthouse, is built on ground saturated with the sewage and filth of centuries. The streets are narrow and dirty, and run perpendicular to the prevailing north-west winds. On the small bay between Fort Ada and the Ras-el-Tin Palace, the summer residence of His Highness the Khedive, is the large Arab village of Anfoosha, with 10,000 inhabitants. The beach here, from time immemorial having been used for natural purposes, is soaked with sewage to a depth of several feet. The like unsanitary conditions reign also in the adjacent village of the Naggareen.

Quarter No. 4. Outside the Moharrem Bey Gate, and between the walls and the Mahmoudieh Canal, is the Arab village of Karmous, in which is situated Pompey's Pillar. This suburb or village, like other Egyptian villages, is filthy and in a grossly unsanitary condition. The ground about the pillar is impregnated with sewage, fæcal odours being very apparent, and it was used until lately for natural purposes by the inhabitants. On the eastern aspect, and leading up to the houses, is a large Moslem cemetery, some 60 acres in extent, filled to repletion with graves, old and recent. A subterranean watercourse, which proceeds from the Mahmoudieh Canal—and continues, it is supposed, to the custom-house, its exact course not being known—has communicating with it, while it passes under the cemetery, several well-like openings through which water was drawn not only for slackening the lime used in making the graves, but also for drinking purposes. It was only in July, after much opposition on the part of the Arabs, that the Governor succeeded in closing these places.

The Mahmoudieh Canal, which forms the southern limit of the village, takes a north-westerly course and ends in the harbour near the New Mole, after passing through the suburbs of Minet-el-Basl and Gabarri. It is almost needless to state that the water of this canal near its outlet is loaded with sewage. It was in this quarter (No. 4) that cholera first broke out at Alexandria in 1865 and 1883.

Quarters Nos. 2 and 3, inhabited for the most part by the European colonies, are the only parts of the city that possess a sewer system, though a very defective one. From Kom-el-Dik to the Place des Consuls a slight gradient exists in the sewers. Beyond the Place to the Ras-el-Tin the sewers are level. The Sanitary Committee found these sewers choked with a semi-solid mass of filth some few weeks ago. Prior to the building of the new harbour works much sewage flowed into the west port, but when the new quays were constructed the outlets of the sewers were blocked up. Into the east port or bay some ten or twelve sewers open on to the beach, and, in addition to this, numerous drain-pipes, having independent connection with the houses built on the margin of the bay, contribute their share towards fouling the shore, and are fast rendering this part of the town uninhabitable. The stench arising from these sewers and drain-pipes is at times overpowering.

The sewers are unventilated, the street gratings which formerly existed and communicated with them were sealed up some four years ago. Every house is in direct communication with an untrapped sewer or cesspit, and the sewer gases necessarily find a ready entrance into the houses, which, under existing conditions, are the only ventilators which the sewers possess.

The soil-pipe is a channel in the masonry of the central wall of each house. With this channel the privies on the several floors have direct connection. This system is not peculiar to Alexandria, but exists in Cairo also, and even in the best class of houses in both cities. In the Palace at Ramleh there are upwards of 100 privies having direct connection with cesspits below the basement without an outlet, and which, it is believed, have never been emptied or cleaned.

For disposal of the existing sewage, and also with the object of getting rid of the dangerous nuisance arising from the number of sewers emptying themselves into the bay, Mr. Cornish proposes to construct an intercepting sewer along the shore, and to carry it out to Fort Ada promontory, situated to the north of the town, and pump it into the sea at a depth of 7 feet below the surface. The depth of water at Fort Ada is said to be 35 feet.

In the absence [?] of any outward set of current, and the fact that the prevailing winds are north-westerly, it is supposed by some that much of the sewage would be carried round Fort Kayid into the bay; but this would seem doubtful. Major Morice Bey's alternative proposal, to construct large steamers into which the sewage should be pumped daily and carried out to sea and thus disposed of, presents so many difficulties and would require such a heavy



# PLAN DE LA VILLE D'ALEXANDRIE

Divisé en quatre quartiers.

Échelle  $\frac{1}{8000}$ .

11 Juillet 1883.

*Égouts indiqués en lignes rouges.*

*Proposed intercepting sewer marked by red dotted lines.*









expenditure as, to my thinking, to make it prohibitory. Mr. Cornish's proposal commends itself to me as the easiest, cheapest, and most practical way out of the difficulty. The town sweepings are collected daily in lighters and towed out to sea and so disposed of.

The rainfall in Alexandria is inconsiderable—according to a Return kept by Mr. Cornish, amounting during the last four years to a little under 32 inches. In 1879-80 there were  $4\frac{3}{16}$  inches; in 1880-81,  $6\frac{5}{8}$  inches; in 1881-82, 13 inches; in 1882-83, 8 inches.

Cairo, August 31, 1883.

Inclosure 3 in No. 12.

*Plan of the Town of Alexandria, prepared by Mr. Cornish, C.M.G.*

No. 13.

*Mr. Cookson to Earl Granville.—(Received January 21.)*

My Lord,

Alexandria, January 8, 1884.

I HAVE the honour to transmit to your Lordship a despatch from Dr. Mackie dated the 6th instant, containing observations on a valuable and interesting Report (which I also forward) by Dr. Simpson, Health Officer for Aberdeen, respecting the late cholera epidemic at Damietta.

I have, &c.  
(Signed) CHAS. A. COOKSON.

Inclosure 1 in No. 13.

*Dr. Mackie to Mr. Cookson.*

Sir,

Alexandria, January 6, 1884.

I HAVE the honour to inclose herewith, for transmission to Her Majesty's Foreign Office, "Some Notes on the Cholera at Damietta," made by Dr. Simpson, Medical Officer of Health of Aberdeen, during a short visit to Egypt last autumn.

While giving him credit for the amount of information he has collected in the short time at his disposal, I feel called upon to make an observation on one or two of his statements which are apt to be misleading. In comparing the cholera epidemics of 1865 and 1883, at p. 16\* of his Report, Dr. Simpson states that the epidemic of 1865 carried off 2,376 of the population of Damietta, while the epidemic of 1883, in spite of all attending circumstances, filth, diseased meat, &c., carried off only 1,928. With regard to this I would observe that the population of Damietta in 1865 was estimated at 50,000 persons, whilst in 1883 it was estimated at about 30,000. The proportion of deaths by the epidemic of 1883 is therefore in reality greater than in 1865.

With regard to a "clue" which he gives at p. 28,† to trace the epidemic to an origin by importation from the Hedjaz, viz., that several of the sicknesses and deaths from acute gastro-enteritis were amongst devout and religious people, I would observe that he does not state whether these devout and religious people performed the pilgrimage in 1882. I would also remark that these devout and religious people probably spent a great deal of their time in an unwholesome atmosphere, viz., in the mosques, which are notoriously filthy and unhealthy, damp and saturated with emanations from the latrines. I make this observation simply as a criticism, not to deny the possibility of its having been imported from the Hedjaz, which, though not proved, is much more plausible than the sanito-political theory which holds that the cholera was imported direct from India.

I have, &c.  
(Signed) J. MACKIE.

Inclosure 2 in No. 13.

*Some Notes on the Cholera at Damietta.*

IN England even with a special sanitary service, a medical registration of deaths, and no lack of medical men, there is often a difficulty in tracing an outbreak of epidemic disease to its first case. If the inquiry reaches so far successfully, a new difficulty arises,

\* See *infra*, p. 52.

† Ibid., p. 56.

for one important step is still required, and that is to determine what was the cause of this first case. Was it imported? or did it originate *de novo*? Frequently it becomes evident that it was an importation, but as frequently the origin of the first case is wrapped in obscurity, and doubt is left on the investigator's mind whether it might not have originated spontaneously. We find some medical men explaining the commencement of an epidemic by spontaneous origin, and others equally convinced that this explanation is erroneous. As such differences of opinion exist here in a highly civilized country, it can be no matter of surprise that in Egypt, where the civilization is of a different kind, and where facilities for investigation are absent, there is want of agreement concerning the cause of the recent epidemic of cholera. Some are of opinion that it was imported, some that it arose spontaneously, and some that it is endemic in the country.

The evidence on which these opinions are based is for the most part scanty, and one opinion, so far as proof goes, is worth about as much as the other.

It is in order to help to elucidate this important question that I have put together notes made during a four days' stay at Damietta.

Dr. Salem Pasha, the learned President of the Board of Health, through Dr. Grant Bey, of Cairo, kindly gave me every assistance in his power to forward my inquiries. In passing, I may mention that the German Commission was there three days, and Dr. Hunter one day. I found four days far too short, and regret much I had no longer time at my disposal, for I was enabled to dip only slightly into this important problem.

In Egypt there are very few medical men, the demand for them being small, for the Egyptians are not in the habit of seeking medical advice. Excepting a few who have studied in the European schools, the generality of the medical men know very little of medicine, and none have any conception of sanitary science.

The Government appoints a doctor to a wide district, pays him a small salary, and expects him to minister to the wants of the patients who may apply to him, but as the majority never apply, he is not hard worked. In Damietta there resides one doctor, who is intrusted with the health of the people in the town and surrounding country. The population is estimated at over 30,000 inhabitants. The deaths are registered by a Secretary, and the causes of death gleaned from the statements of the friends are put down in the register, in a haphazard manner, much according to the tastes and preferences of the Secretary.

With such a wide area, and so large a population, it is inconceivable that the medical man could have an accurate, or even general, notion of the causes of death, except in those few instances where he has been called in during the illness. It is absolutely impossible that he should have any trustworthy information of the prevailing diseases at any particular time in his district. It is said that the local medical man should know best the most likely origin of the disease, but after the above explanation it will be readily discerned that all those advantages which under other circumstances he would have derived from special education, position, and experience, and which would have most fitted him to give a valuable opinion on the causes of the epidemic, or give material aid to other investigators, are entirely wanting.

To the stranger there are additional drawbacks to contend with. The Egyptians have a natural dread of being questioned through fear of compromising themselves unawares. Possibly this fear is engendered from the arbitrary and despotic powers their superiors sometimes capriciously exercise over them. Whether this is so or not, the inhabitants have an unpleasant habit of stating whatever will suit themselves, or the view most in favour at the time, or contradict themselves so often as to leave one in doubt what they really know or mean to convey. Numerous examples of this phase of their character came under my observation; I will mention two.

One morning, a Consul's servant, in great grief, told his master that his (the servant's) child had died the previous evening of cholera, and that two of the elder children were now attacked with vomiting and purging, and were seriously ill. Asked if he had sought medical advice he replied no, it was useless, for if his children died it was the will of God, and no one could prevent it. The Consul, however, insisted on a doctor being sent for. The man did as he was bid, and informed the doctor of the child's death. An autopsy was suggested. This alarmed the father, and he immediately decided to say nothing about the other children, but hurried home and hid them. Afterwards he declared they were quite well, and positively denied he had ever said they were ill. He also induced a number of his friends to come forward and testify that the children were quite well, and that neither the elder children nor the one who died had ever had vomiting or purging. The doctor saw the body of the dead child, and certified it had died of diphtheria.

Another curious incident occurred when inquiry was made of a respectable man



about his wife, who had died of cholera. First he said his wife died at a friend's house ; a few moments after he declared she had died at home, and possibly thinking he had been too definite, he finally remarked he really could not remember.

It is well understood at Damietta that the Governor of the district is strongly of the opinion that the cholera was imported into Egypt by the English, or at all events by an English ship coming from India.

From a reliable source I learn that the present Governor has been in Damietta about six years. The town was in a much better sanitary condition before his administration commenced ; it was then cleaner, and some attention was given to scavenging. Now, cleaning is only a process for particular occasions. When it was understood that Dr. Hunter would visit the town, the inhabitants by forced labour were employed for three days in scavenging. The town underwent a similar purification before the visit of the German Commission. The latter cleansing has been considered sufficient, for none has been done since that time.

Damietta is a small town of nearly 30,000 inhabitants, situated on the banks of the Nile, about 4 miles from the sea. The river just before it reaches the town, takes rather a sudden bend and runs into a deep basin, which, after passing the town, becomes shallow, and this shallowness is still further increased by the bar at the river's mouth. The result of this is that when the Nile is at all low, the water in front of Damietta is very slow flowing, indeed almost stagnant, and whatever may at that time be thrown into the river is carried into this basin and remains there, and the same happens with any material from the town. When the river is high the current is then comparatively rapid and sweeps away impurities thrown into it. The houses along the bank, for the most part, come quite up to the river side. Many small trading boats lie alongside these houses. The boats chiefly come from the small islands in the Archipelago, from Greece, from the Syrian Coast, and a few from Port Saïd. Those from Port Saïd have two routes, some come by sea, others cross the Menzaleh Lake. The sailors are chiefly Greeks, Syrians, and natives ; there are no English among them. There is plenty of communication between Port Saïd and Damietta, for many of the former inhabitants of Damietta have left and reside at Port Saïd, so there are always natives crossing over from Port Saïd to see their friends and relations at Damietta and *vice versa*. There is also an interchange of merchandize between the two towns.

The manufactures in Damietta are silk and cotton-weaving. The people, who appear to be poor, are fond of fish, which they seem to prefer in rather a putrid state. The chief institution in the town is its fish market. There are numerous cafés frequented by sailors, mostly Arabs and Syrians.

There are no squares, gardens, open spaces, or places of recreation. The whole town consists of a number of narrow, irregular, unpaved and undrained lanes. The site is low-lying, and the soil, consisting of the alluvium deposited by the Nile, is damp, and after rains it is swampy. The air is odorous with nauseating and miasmatic vapours constantly given off from stagnant pools filled with decomposing animal and vegetable matter. Green pools with gases bubbling up from them are seen in every part of the town. To me they were a source of anxiety, for I felt that I might be laid down with some malignant fever at any moment.

It had been raining the day before I arrived, and it was amusing to see the Arab children take off their scanty clothing, enter the puddles in the street, play, bathe, and roll in them, and come out covered from head to foot in a coating of mud and mire. Even in the best parts of the town it was difficult to get from one side of the street to the other.

The inhabitants when they trouble themselves to be so far cleanly, which I am given to understand is not always the case, and of which I myself had ocular demonstration, throw all their slops and refuse in front of the door or near the dwelling. This practice is the cause of the above-mentioned fermenting mass of half solid and half liquid matter ; there it lies, rots, soaks into the soil, and gives forth its offensive and dangerous exhalations. The street or surroundings of the house is the common sewer and cesspool for the town.

Of all the disgusting places, offensive alike to the sense of sight and smell of a European, the latrines and baths attached to the mosques are the worst because of their overpowering stench. Long before they are reached the malodours they send forth distinguish them. The cemeteries also add their share, and in this town of filth and stinks there is not one redeeming feature.

The impression given to the visitor is that Damietta has been a larger and more important town than at present. The houses appear to be too numerous for the number of inhabitants. The best class houses are large and fairly built, but look very old, and are falling into ruins. Invariably the lower apartments are uninhabited, generally used for

stores or rubbish, and always very filthy. In the quarter where the cholera first violently broke out and in many other parts of the town, the houses are one-storied, badly built and half in ruins. They are chiefly made of a compost of mud, manure, and straw. The floor is simply the soil on which the hovel, for they can be called nothing else, is erected. There is frequently a slightly raised portion of the ground which does duty for a bed, on this there may or may not be a mat. Several apertures in the sides of the hut near the roof act for windows and ventilators; but little air or sunshine gains admission by these holes, so that the inside of the dwelling is dark and sometimes damp. It is often strewn with rubbish. There is no furniture, but sharing the cabin are whatever animals the inmates may happen to keep.

The inhabitants live mostly out of doors, and use their houses chiefly for shelter at night. Those who live in the houses on the banks of the Nile or near the canal which runs through the town, empty their refuse into the water, they also wash their clothes, utensils, and themselves in the Nile or canal and draw their drinking water from the same source. I have seen a woman empty the filthiest liquid into the river and another woman come immediately after and fill her pitcher with water for drinking purposes from the same spot before the water had become again clear. The Arabs do not filter their water, but prefer it from the Nile with whatever it may contain. To them filtered water is as distasteful as distilled water is to most people.

All European notions of sanitation are outraged in this town. I have mentioned pollution of soil, air and water. I have yet to add tainted and diseased meat.

It was about the beginning of February that bovine typhus broke out at Damietta, and extended up the river to other villages and towns. Though there is no direct charge exacted for burying these animals, there are indirect ones, and the owners preferred to throw the carcasses, minus the hides, into the river, both because it is easier and because it costs nothing. Mr. Goodall, who was employed by the Egyptian Government to superintend the clearing of the east branch of the Nile, and with whom I had the advantage of a conversation, took out 400 putrid carcasses in one week, most of which were in the vicinity of Damietta, and most of them were in such a decomposed condition as to make it impossible to drag them out of the river except in pieces. The work was of an intensely offensive and sickening nature; many of the diseased animals were eaten, and the carcasses, as they gradually accumulated, created a pestilential state both of the atmosphere and the water. This cattle plague had appeared in and around Damietta for the four previous years, but not to the same appalling extent.

Notwithstanding the unsanitary condition of the town which I have described, Damietta to the Arab's mind is a healthy spot. It is cooler than many parts of Egypt. The native physicians send their patients here to recover their health, although whether they do or not is another matter. The idea of Damietta in its present condition as a health resort seems to be about the most distorted fancy ever entertained, and reminds one of the Spanish physicians of a former century, who maintained that human ordure kept inside houses was good for health, because it absorbed all noxious vapours. There are some smells, however, that the Egyptians strongly object to, namely, those of carbolic acid and chloride of lime. It is believed they induce abortions and other untoward accidents.

The general state of health in Damietta may perhaps be gauged by the number of deaths.

This Table shows the number of Deaths in the several years from 1860 to 1882.

Year.				Number of Deaths.	Year.				Number of Deaths.
1860	..	..	..	1,103	1872	..	..	..	1,230
1861	..	..	..	941	1873	..	..	..	1,274
1862	..	..	..	1,502	1874	..	..	..	1,196
1863	..	..	..	1,096	1875	..	..	..	1,537
1864	..	..	..	1,092	1876	..	..	..	1,591
1865	..	..	..	3,747	1877	..	..	..	1,449
1866	..	..	..	987	1878	..	..	..	1,259
1867	..	..	..	1,120	1879	..	..	..	957
1868	..	..	..	911	1880	..	..	..	1,237
1869	..	..	..	1,004	1881	..	..	..	1,112
1870	..	..	..	929	1882	..	..	..	1,061
1871	..	..	..	1,143					

Whether all the deaths are registered I am unable to say. The above is the official death-rate.



The healthiest year has a death-rate of nearly 30 per 1,000. Some years have 50 per 1,000. The cholera year of 1865 over 100 per 1,000; and over 100 per 1,000 in 1883. No wonder Damietta looks desolate!

That a disease should be declared to have originated in a country from the unsanitary condition in which it was allowed to remain is never palatable to those who have the control of these affairs. The Egyptian Board of Health naturally clings to the opinion that the disease was imported from India. They are, I understand, supported in their views both by the French and German Commissioners.

Before stating any opinion about importation, it may be useful to compare the two epidemics of 1865 and 1883 with regard to time, duration, and intensity.

The following Table shows the Deaths in the two epidemics of Cholera in Damietta—1865—1883:—

1865.		1883.	
Date.	Number of Deaths.	Date.	Number of Deaths.
..	..	June 22, 1883	6
..	..	" 23, "	13
..	..	" 24, "	15
..	..	" 25, "	28
Ba-una 20,* 1865	1	" 26, "	37
" 21, "	10	" 27, "	113
" 22, "	35	" 28, "	101
" 23, "	53	" 29, "	113
" 24, "	67	" 30, "	110
" 25, "	93	July 1, "	141
" 26, "	107	" 2, "	130
" 27, "	142	" 3, "	110
" 28, "	157	" 4, "	111
" 29, "	172	" 5, "	109
" 30, "	171	" 6, "	107
Abib 1, "	169	" 7, "	92
" 2, "	166	" 8, "	88
" 3, "	172	" 9, "	53
" 4, "	121	" 10, "	52
" 5, "	102	" 11, "	65
" 6, "	112	" 12, "	40
" 7, "	73	" 13, "	38
" 8, "	72	" 14, "	38
" 9, "	84	" 15, "	35
" 10, "	50	" 16, "	27
" 11, "	43	" 17, "	18
" 12, "	42	" 18, "	17
" 13, "	21	" 19, "	22
" 14, "	18	" 20, "	7
" 15, "	14	" 21, "	14
" 16, "	13	" 22, "	6
" 17, "	7	" 23, "	8
" 18, "	10	" 24, "	16
" 19, "	8	" 25, "	5
" 20, "	11	" 26, "	4
" 21, "	12	" 27, "	3
" 22, "	7	" 28, "	3
" 23, "	13	" 29, "	5
" 24, "	5	" 30, "	2
" 25, "	5	" 31, "	3
" 26, "	2	August 1, "	6
" 27, "	4	" 2, "	0
" 28, "	2	" 3, "	0
" 29, "	2	" 4, "	3
" 30, "	0	" 5, "	0
Misra 1, "	2	" 6, "	2
" 2, "	3	" 7, "	0
" 3, "	1	" 8, "	3
" 4, "	0	" 9, "	0
" 5, "	0	" 10, "	0
" 6, "	0	" 11, "	0
" 7, "	0	" 12, "	0
" 8, "	0	" 13, "	1
" 9, "	1	..	..

\* The 20th of Ba-una corresponds to our 26th of June.

The two epidemics show some interesting points of resemblance. They commenced about the same time of the year when the Nile was at its lowest; they caused within five or six days of their appearance over 100 deaths a-day. They continued at a high death-rate for ten or eleven days, and then they gradually subsided, and disappeared about the time when the Nile had considerably risen. The epidemic of 1865 lasted fifty days, and destroyed 2,376 persons; that of 1883 lasted fifty-three days, and destroyed 1,928 lives.

The only material point of difference is that the epidemic of 1883, in spite of all its attending circumstances of filth, diseased meat, and polluted water, was actually less severe than the previous epidemic. This, however, may be accounted for by the active measures taken to clear the Nile, and by the steps adopted to purify the town; but a more potent agency, I am of opinion, than these and others put together, was an earlier and more rapid rise of the Nile. It gave clean and fresh water to the people in spite of their filthy habits. It was like a new water supply granted to them, and seemed to have the almost immediate effect of staying the epidemic.

Whatever may have been the origin of cholera at Damietta, there is little doubt its rapid spread was mainly due to defilement of the water.

The cholera of 1865 was imported into Damietta, and positive evidence is brought forward to prove it was imported in 1883.

Two sources are indicated, either of which, or perhaps both, are believed to be the carriers of the disease into Damietta:—

1. Mohamed Khalifa, a fireman on board the "Timor," from Bombay.
2. Ayouzi-el-Zeudaia, a woman trading between Port Saïd and Damietta.

When Khalifa was first put forward as the importer of the disease, Dr. Chaffey Bey and Dr. Ferrari showed very conclusively he did not arrive in Damietta until after the outbreak had commenced. He was in prison at Port Saïd on the day when the cholera broke out. The authorities at Damietta now state that some important facts have been omitted by the doctors. The Governor informed me he had proofs in his hand that Khalifa visited the town immediately on leaving his ship, and it was only after he had returned from Damietta to Port Saïd that the Governor of the latter town put him in prison.

According to a written statement I received from the Governor, Khalifa arrived at Damietta on the 13th or 14th of the Chabban, which corresponds to the 19th or 20th June. He came to visit his parents, who reside in the town, but on that day, not expecting their son, they had gone over to Port Saïd. Khalifa, therefore, went to a café in Damietta, kept by Salem-el-Sandoubi, much frequented by sailors. Here he got into trouble, was arrested and put into prison, where he remained until his parents returned and begged for his release, which the Governor granted. After this Khalifa started off for Port Saïd, and conducted himself so noisily in that town as to be arrested and imprisoned. A few days after Khalifa's visit to the café, Salem-el-Sandoubi and his assistant died of cholera. Further, their deaths occurred on the same day. Both men lived in the quarter of the town where cholera first broke out violently, which was a considerable distance from the café. These are the facts in support of Khalifa having imported cholera. He seems to have been fixed upon simply because he was the only one in Damietta who had a remote connection with Bombay.

I made particular inquiries into the sickness and death of the two café men, and ascertained they were only ill one or two days. They died on the 28th June, *i.e.*, eight or nine days after Khalifa's visit. They were by no means the first attacked by the disease in the quarter in which they resided, nor had Khalifa visited this part of the town. On the 22nd June there were 6 deaths from cholera, on the 23rd, 13 deaths, and more in daily increasing numbers before either of these men took ill. They were well while those around them were dying fast, and they only became victims to the cholera *after* a large number of their neighbours had succumbed—on the day, indeed, when there were 101 deaths. To suppose that these men, even if infected by Khalifa, had spread the disease before they took ill, and to such an extent, is to suppose an impossibility; moreover, Khalifa himself was never ill. From all description given of him he appears to have been drunk, and it is quite certain he did not come from an infected ship. Granted, then, that there had been some facts omitted, and that Khalifa had visited Damietta immediately on leaving his ship, there is still not the slightest evidence to connect him in the least degree with the epidemic.

The second case brought forward is as deficient in proof as the first. A woman named Ayouzi-el-Zeudaia some years ago lived with her mother in Damietta, but, getting married, she removed to Port Saïd. In the latter town she began business, and carried coffee, silk, &c., from Port Saïd to Damietta, returning with other exchanged articles of merchandize. When in Damietta she usually visited the house of Mohamed Dabia. In this house lived a woman named Fatima. Fatima and Zeudaia were great friends, and on



these visits frequently spent a long time in each other's company. Fatima knowing how to do Syrian cooking, was invited by Ali Markabi, a friend, to a banquet, in order to prepare a Syrian dish. She went to his house on Tuesday, the 19th June, was attacked with vomiting and purging the same day, and died the following night. The negress servant of Ali Markabi died of cholera soon afterwards, and in a few days the wife of Ali Markabi herself.

The movements of Zeudaia were as follows :—

She arrived at Damietta from Port Saïd on the 6th Chabban, which corresponds with our 12th June. She did not see the Syrian woman who lived in the same house until the 16th June, but in the meantime went over various parts of the town. When the two women met they remained in one another's company the most part of the day. On the 20th June, four days after their first interview, the Syrian woman was dead. Twelve days after the arrival of Zeudaia, the wife of Mohammed Dabia, the owner of the house, died of cholera. A few days before the death of the landlady Zeudaia visited her brother residing on the other side of the River Nile, and two days after the visit the daughter of this brother is said to have died of cholera. On the 24th June Zeudaia departed for Port Saïd, and three or four days after was attacked with cholera herself.

An examination of the register of deaths gives some information. It shows :—

1. The Syrian woman died on the 20th, registered, "Aeute gastro-enteritis."
2. The wife of Dabia, the owner of the house, died on the 24th June.
3. The negress servant of Ali Markabi on the 29th June.
4. The wife of Ali Markabi on the 1st July.
5. The name of Zeudaia's niece could not be found in the register (since my arrival in England the date has been kindly forwarded me. It is put down as the 15th July).

If Fatima was the first person attacked with cholera at Damietta, it is possible the wife of Dabia, living in the same house, caught the infection from her. It is, however, very improbable that the death of the negress servant or of the wife of Ali Markabi was due to Fatima's visit before she showed any signs of illness. Their deaths may have been caused by visiting the wife of Dabia during her illness, or more probably by that general cause which was destroying at the time over 100 persons.

Even if Fatima was the first attacked with cholera in Damietta, there is no evidence of any worth to show that Zeudaia brought the disease to her, nor is it traceable that any one brought it to the house.

As mentioned before, Zeudaia herself was attacked with cholera at Port Saïd on the 27th or 28th June, eight days after the death of Fatima. Instead of Zeudaia importing cholera into Damietta, she became infected at Damietta, and was one of those who conveyed the cholera to Port Saïd.

These cases, and others of a similar kind, do not explain the origin of the epidemic. Besides, in the several investigations, the deaths alone have been considered. Because there was one death distinctly choleraic on the 20th June, and six deaths on the 22nd, the 20th June has been hastily decided upon as the first day in which cholera appeared at Damietta. My investigations, however, lead me to a different opinion, namely, that cholera was present in Damietta before it ever came to the public notice, not in an epidemic form, but gradually accumulating its energy for the apparently sudden outburst.

If we look at the monthly deaths for 1882 and 1883 we see a greater number in the months of January, February, March, April, May for the year 1883 than for 1882.

TABLE showing the Monthly Deaths for the two Years.

1882.					1883.				
Month.		Male.	Female.	Total.	Month.		Male.	Female.	Total.
January	..	38	42	80	January	..	66	63	129
February	..	37	36	73	February	..	78	57	135
March	..	45	35	80	March	..	72	45	117
April	..	40	38	78	April	..	52	50	102
May	..	43	44	87	May	..	58	49	107
June	..	59	35	94	June. { to 21st	..	48	43	756
July	..	54	31	85	June. { after	..	323	342	
August	..	56	60	116	July	..	759	799	1,558
September	..	69	39	108	August	..	67	92	159
October	..	41	40	81	September	..	57	55	112
November	..	35	44	79	October	..	..	..	..
December	..	53	47	100	November	..	..	..	..
					December	..	..	..	..

The excess in the number of deaths appear largely to be due to extra bowel complaints.

TABLE showing the Number of Deaths in each Month caused by Bowel Complaints.

1882.					1883.					
Month.	Diarrhoea.	Dysentery.	Gastro-Enteritis and Typhoid.	Total.	Month.	Diarrhoea.	Dysentery.	Gastro-Enteritis and Typhoid.	Cholera.	Total.
January ..	6	3	9	18	January ..	16	21	4	..	41
February ..	5	6	8	19	February ..	10	16	13	..	39
March ..	3	9	8	20	March ..	11	17	12	..	40
April ..	5	8	7	20	April ..	13	3	16	..	32
May ..	8	14	5	27	May ..	7	15	24	..	46
June ..	7	10	5	22	June ..	16	18	15	536	585
July ..	5	13	11	29	July ..	2	12	11	1,377	1,402
August ..	11	14	10	35	August ..	..	7	9	15	31
September ..	11	10	13	34	September ..	10	7	12	..	29
October ..	6	10	9	25	October ..	..	..	..	..	..
November ..	10	14	9	33	November ..	..	..	..	..	..
December ..	13	19	3	35	December ..	..	..	..	..	..

It should also be borne in mind—

1. The register was not kept correctly with regard either to entries of death or names of diseases. There were causes of death put down which even the native doctor did not comprehend.

2. The case claimed by the authorities to be the first case of cholera was registered gastro-enteritis acute.

3. For at least two months previous to the 20th June there had been an unusual number of cases marked down gastritis, enteritis acute.

Besides these there was the additional fact that before cholera became epidemic, an unusual sickness consisting mainly of diarrhoea and vomiting of a very prostrating kind was prevalent in and around Damietta; many deaths were caused by it.

There came to my notice many instances of people having suffered, some of the more trustworthy may be particularly mentioned.

1. A woman called Houria Mauné, who made and sold bread, was on the 4th May attacked with vomiting, purging, and cramps in the limbs, her whole body became unnaturally cold, her eyes were sunken, and she was only able to speak in a whisper. The diarrhoea and vomiting lasted for two days and then suddenly ceased, but she was so debilitated by this sickness as to be unable to rise from bed until ten days after. She afterwards saw several of her friends and neighbours die of cholera, and is now confident was also cholera. At the time of her sickness a young man was attacked in a similar manner in the same house.

2. On the 14th May a barber in the town was attacked with diarrhoea, vomiting, and cramp. He was taken home, and it was several days before he recovered. A friend who was with him at the time had a similar attack.

3. The wife of the servant of the Acting German Consul was attacked with choleraic symptoms on the 1st June.

4. The servant of the Austrian Consul was attacked with all the symptoms of cholera on the 4th June.

But if these and others which I have not mentioned were sporadic cholera cases, why did it not become epidemic at once?

The explanation appears to me to be this. The cholera poison was present in the town, but could not assume an epidemic form until the drinking water was thoroughly contaminated. This happened when the Nile had reached its lowest point, and continued for the first few days after the Nile had begun to rise. The cases here and there in various parts of the town a month or two before were from local contamination of the water kept in the house. There may have been a few instances from direct contagion, but nine-tenths appeared to me to be due to some other cause than direct contagion. Although the origin is pushed back to an earlier date, the question still remains, were the cases in the earlier part of the year due to importation



or spontaneous generation? I think we may put endemicity aside. If the disease had been endemic in Damietta, it had many opportunities when the Nile was low of becoming epidemic. That it did not is fairly certain, for however incorrectly the register books may be kept, an epidemic of considerable size could not pass unnoticed. Whether the disease is endemic in other parts of Egypt I am unable to say. In the villages of Upper and Middle Egypt, where most of the diseases are registered as caused by the evil spirit or devil, there is no surmising what diseases may be present.

I cannot say I am much in favour of spontaneous generation, although it must be admitted, if ever a state of filth in its general sense of pollution of soil, water, air, and food produced cholera, Damietta possessed the wherewithal in a high degree. My time did not allow me to examine this point as it deserves.

In regard to importation, there was one curious fact which struck me. Several of the sicknesses and deaths from acute gastro-enteritis were amongst devout and religious people. Could the cholera be traced to some returning pilgrim from El Hedjaz about December, 1882? If inquiries were made in this direction, I think they would probably be crowned with success, unlike those purporting to prove the direct importation of cholera from India into Damietta through Port Saïd. As a result of my visit to Damietta, I can confidently assert that the cases hitherto brought forward, whether of sailors, Indian merchants, or natives bringing cholera into Damietta, fall to the ground when strictly scrutinized. The Arabs do not attach much importance to dates, so that details which, when put together, appear conclusive enough to them do not bear analyzing.

The purport of the foregoing notes may be summed up—

1. The sanitary condition of Damietta is unusually bad, even for a town in Egypt.
2. The cases alleged to have been the means of introducing cholera into the district upon examination entirely break down.
3. There were cases occurring with all the characters of cholera before the prominent outbreak.
4. The endemic origin in Damietta cannot be well supported, on account of the long interval between the two great epidemics with unusual facilities, present almost every year, for it becoming epidemic. This is in no manner intended to deny its alleged endemicity in the upper parts of Egypt.

There is one important point forgotten (by the Egyptian Government), that whether imported or not, the epidemic assumed its gigantic proportions by the utter disregard of cleanliness. A people that does not provide for a safe removal of its effete matter, but allows it free access to its drinking water, are practising habits which are not only a danger to themselves, but also to all European nations who have communication with them. Quarantines, cordons sanitaires, and other similar devices are absurd. Except at the time of terror, they are only partially carried out, and nothing after all is beyond a bribe.

When in Egypt, it was to me a matter of regret to see other nations, such as France and Germany, send out scientific medical men to especially investigate not only the origin of the recent epidemic, but the nature of the poison or germ; while England was content with cleaning up and lending medical aid. This action on her part was no doubt the most efficacious at the time, but since she possesses the largest part of the commerce from Egypt, and through the Canal, surely it was to her best interest to learn exactly how the epidemic arose. With such knowledge acquired it would have been easier to have prevented another outbreak. Other nations clamour for quarantine; a long quarantine hurts no nation but England.

(Signed) W. J. SIMPSON, M.D.,  
Medical Officer of Health, Aberdeen.

No. 14.

*Lord Amptill to Earl Granville.—(Received January 28.)*

My Lord,

*Berlin, January 22, 1884.*

WITH reference to my despatch of the 7th ultimo, I have the honour to forward six copies of the further Report, dated Calcutta, the 16th December of last year, addressed to the Secretary of State for the Home Department, by Dr. Koch, the Chief of the German Scientific Expedition sent by the Imperial Government to Egypt and India to investigate into the causes of the cholera epidemics in these countries. The Commission left Egypt on the 13th November, and arrived at Calcutta on the 11th ultimo, after visiting *en route* Colombo and Madras.

Dr. Koch reports that Ceylon has been free from cholera during the last five years, and that the disease is not endemic in that island.

At Madras the Commission investigated the water supply of the city, and visited the hospitals and prison; no cases of cholera were reported in these institutions, but in certain districts in the south of the Presidency, notably at Madura and Tanjore, cholera was said to be prevalent. Dr. Koch expresses his grateful thanks for the valuable information obtained from the Sanitary Commissioner at Madras, as well as from the Surgeon-General with the Government of India, and from the authorities of the Medical College Hospital at Calcutta.

Every facility has been afforded by the medical authorities to the Commission to inquire into the origin of the disease; and with the material placed at their disposal, Dr. Koch states that the members of the Commission find their time fully occupied.

At the end of his despatch Dr. Koch enumerates the special subjects to which the attention of the Commission is being given.

1. Microscopical *post-mortem* examination of cholera bacilli.
2. Experiments on animals by inoculation; especially by means of direct injection into the intestine.
3. The breeding of bacilli found in the intestines of cholera corpses, and the inoculation of animals with the same.
4. The biological examination of bacilli.
5. Disinfecting experiments to check or annihilate the bacilli.
6. Examination of ground water and air in relation to choleraic infection.
7. Lastly, special examination into the disease as it exists in India; as to its endemicity, its existence in gaols, in the army, and on board ships; as to the way in which the disease is periodically brought from the districts where it is endemic to other countries; special attention being paid to the spread of infection by pilgrims and religious ceremonies; and lastly, the preventive measures adopted in India for checking the disease.

Dr. Koch concludes by saying that he will forward further reports on the subjects enumerated under heading 7.

I have, &c.  
(Signed) AMPHILL.

#### Inclosure in No. 14.

*Extract from the "Nord Deutsche Allgemeine Zeitung" (evening edition) of  
January 21, 1884.*

(Translation.)

A FOURTH Report, dated Calcutta, 16th December, has been received from Dr. Koch, the Foreman of the German Scientific Commission for the investigation of the cholera, has been received, to the following effect:—

"The Commission charged to investigate the cholera arrived at Calcutta on the 11th December; the mails had then just left for Europe, so that the present Report had to await the next outgoing post, eight days later. The delay has, however, rendered it possible to acquaint your Excellency with the commencement of our labours in Calcutta.

"The Commission started from Suez in the English steamer 'Clan Buchanan' on the 11th December. The vessel made a halt of two days and a half at Colombo and of nearly two days in Madras. The Commission availed itself of this opportunity to acquaint itself with the sanitary conditions of these places, and their state in respect to the cholera, as far as this was found practicable during the brief stay. In Colombo no case of cholera was met with; according to information we received, the Island of Ceylon has been altogether quite free from cholera for the last five years, and, at the least, does not form one of the foci of endemic cholera. In Madras, on the other hand, the cholera is now prevalent to moderate extent in the capital, and raging severely in several towns in the southern portion of the Presidency, especially Madura and Tanjore. In the hospitals in the city of Madras which were visited by the Commission no cholera patients were met with. The Commission was enabled, however, to inspect the prison establishment, and to investigate the water supply and canalization of this city, which is an important place in the history of the cholera. Moreover, the Commission received very valuable information respecting the deportment of the cholera in the Madras Presidency from the Sanitary Commissioner, whom an experience of many years has made well acquainted with the subject. The halt in Madras proved, therefore, very useful for the objects of the Commission.



"On its arrival at Calcutta the Commission was received by the German Consul, who conducted it on the following day to the Surgeon-General with the Government of India. The latter showed the Commission every courtesy, and assured it every possible support, both as regards putting the requisite working-rooms at its disposal, and in securing for it the opportunity of observing any cholera cases which there might be in the Calcutta hospitals. He conducted the Commission to the Medical College Hospital, where some excellently adapted working-rooms, fitted with gas and water, were selected and placed at the service of the Commission. It was found practicable to get the laboratory into working order by the 13th December, and, as a case of cholera had been brought to the Medical College Hospital, to begin work at once. On the 14th December the Commission was enabled to proceed to the dissection of a cholera corpse which had been sent from the General Hospital to the Medical College Hospital, and on the next day to the dissection of two more cholera corpses in the Sealdah Hospital. Abundant material of useful kind for the experiments which it is purposed to make was thus obtained, a number of experiments was begun, and the Commission is now again in full work.

"Towards the end of November the number of fatal cholera cases had reached its minimum. Since that date, however, it has begun to increase again, and, according to medical opinion here, so many cholera cases are to be expected in the hospitals that there will be no lack of material for the investigations of the Commission.

"What is very important also is that there are apparently no difficulties in the way of *post-mortem* examination of cholera corpses in the hospitals here, and that the *post-mortem* examinations can be performed sufficiently soon after death to prevent the investigation being interfered with by any decomposition.

"Taking all these circumstances into account, no better locality could have been selected for the continuance of our investigation into the cholera.

"I have arranged the further tasks which the Commission will have to perform with the view to obtain results of practical value, and these I permit myself to set out as follows for your Excellency :—

"1. Microscopic examination of as many cholera corpses as possible, with the object of amplifying and confirming the results obtained in Egypt with respect to the presence of bacilli in the mucous membrane of the intestines. Also particular experiments to test the specific character displayed by these bacilli under the microscope, and establish, if possible, a sure distinction between them and other bacilli resembling them in shape and size.

"2. Investigations upon the subject of the occurrence of the cholera in animals. Resumption of infection experiments upon various animals with choleraic matter, and particularly experiments conducted on methods which have not yet been employed, such, for instance, as injection into the gut.

"3. Artificial propagation of bacilli found in cholera corpses, and employment of the animalculæ thus artificially propagated to infect animals.

"4. To determine the biological character of these bacilli, especially the formation of spores, length of life, behaviour in different nutrient media, and at different temperatures.

"5. Disinfection experiments, for the purpose of hindering the growth, or if practicable, destroying the bacilli.

"6. Examination of earth, water, and air in their relations to cholera-infectious matter, especially with regard to the question whether such cholera-infectious matter can exist in regions where endemic cholera prevails, independently of the human body, for example, confined to the ground in certain processes of decomposition.

"7. Special researches into the conditions of the cholera in India :—

"(a.) Correspondence between the cholera and special peculiarities of the population and their surroundings in the endemic districts.

"(b.) Outbreaks of cholera in prisons, among troops, and in ships.

"(c.) Conditions of such localities as are most visited as well as of such as are most spared by the disease in districts where the cholera is endemic.

"(d.) The mode and means of transmission of cholera beyond the bounds of the endemic district, and the route by which it is conveyed, both in India and beyond the frontier. (The Commission, on this point, has particularly in view the spread of infection by certain religious customs and the diffusion of the disease by pilgrims, as well as its extension by shipping and along trade routes.)

"(e.) The regulations found to be effectual in India for keeping down the cholera in prisons and among the military, and the conditions under which, in some Indian towns, such as Madras, Pondichéry, Guntur, and Calcutta, a remarkable decrease of mortality from cholera has taken place.

"In case its investigations into the microscopic organisms supposed to occasion the

disease should not attain sufficiently certain results to afford a basis for practical measures, the Commission purposes to devote more particular attention to point 7, in order to be able to submit to your Excellency proposals for prophylactic and remedial measures applicable to the German Empire.

(Signed) "DR. KOCH.

"To the Secretary of State for the Interior,  
His Excellency Herr Boetticher."

No. 15.

*Earl Granville to Sir E. Baring.*

Sir,

*Foreign Office, January 29, 1884.*

I COMMUNICATED to Surgeon-General Hunter your despatch of the 26th November, and its inclosures, relative to the second outbreak of cholera at Alexandria last year.

I now transmit to you copies of a Report which he has been good enough to make on the subject.\* The preparation of the plan necessary to explain the papers now forwarded has delayed their transmission.

I have to request that you will, in such manner as may appear best for the purpose, call the attention of the proper authorities to Dr. Hunter's observations.

I am, &c.

(Signed) GRANVILLE.

No. 16.

*Lord Ampthill to Earl Granville.—(Received February 18.)*

My Lord,

*Berlin, February 14, 1884.*

WITH reference to my despatch of the 22nd ultimo, I have the honour to inclose six copies of a further Report dated Calcutta, the 7th ultimo, which has been received in Berlin from Dr. Koch, the Head of the German Scientific Commission now inquiring into cholera in India.

Dr. Koch, in this Report, gratefully acknowledges the assistance he has received from the authorities in authorizing *post mortem* examinations, and in placing sufficient material at the disposal of the Commission to enable them to make important progress in the task undertaken by them.

Referring, then, to the results obtained from microscopical examinations, the Report states that the same bacilli were found in the intestines of patients who had died of cholera in India as had been the case in Egypt.

It had been a question in Egypt whether these bacilli were but a species of the many parasites regularly to be found in human intestines, or whether their presence was only contemporaneous with the disease itself.

With the help of the appliances furnished by the Sanitary Board, this doubt has been cleared up.

The bacilli taken from cholera intestines were carefully isolated, and reared separately one from another in gelatine; this process showed characteristic peculiarities in their shape and growth, clearly differentiating the choleraic from other bacilli, and with the means thus obtained it can be definitely decided whether these bacilli are ordinary or extraordinary inhabitants of the human intestines.

Dr. Koch then proceeds to enumerate the experiments made to investigate this point. The corpses of patients who had died of pneumonia, dysentery, consumption, and kidney disease were examined, and in none were the specific choleraic bacilli to be found. The intestines of different animals, as well as other bacterial-producing substances, were then tested and the same result obtained. Should this theory be capable of positive proof a very important result will have been obtained, and the connection between the appearance of the specific choleraic bacteria and the disease itself will be placed beyond reach of doubt, even should it not be possible to reproduce therewith the disease in animals.

But Dr. Koch expresses the hope that experiments recently made on animals with this object will lead to a successful issue.



In addition to this experimental research, the Commission has been actively engaged in gathering "highly interesting and important" information with regard to the disease as it affects the city of Calcutta itself. In towns outside of India, which are visited by cholera epidemics but at long intervals of time, the influence on the disease of sanitary improvements (such as a good water supply, drainage system, and the like), cannot be accurately determined.

On the other hand, in cities like Calcutta, where cholera is endemic and the mortality from that disease is every year considerable, all sanitary improvements should show at once a more or less considerable result on the cholera returns in the bills of mortality.

Accordingly, it appears that since 1870 the cholera in Calcutta has suddenly and very sensibly declined; before that year the percentage averaged 10 for every 1,000 inhabitants annually, since then it has fallen to 3 per 1,000 inhabitants. The Calcutta doctors, almost one and all, attribute this marked decline to the establishment of a good drinking water supply, and Dr. Koch states that the Commission are carefully examining this question, and after collecting sufficient data will then form their own opinion thereon.

Finally, Dr. Koch refers to the theory propounded by the French Commission sent to Egypt to examine into the recent cholera epidemic in that country, viz., that in the blood of cholera patients there are found specific organisms peculiar to that disease. This theory Dr. Koch does not agree to. Certain blood-formations, he explains, are found to be abnormally increased in patients suffering from many febrile sicknesses (such as spotted fever, pneumonia, &c.), and the same effects are observable in the blood of cholera patients.

This is, however, no new discovery, and is mentioned in Cunningham's Work on Cholera published in 1872. Dr. Koch considers that the French Commission has fallen into the same mistake as some of their predecessors in looking upon these blood-formations as specific choleraic organisms, whereas they are to be found equally in the blood both of healthy persons and of those suffering, as above stated, from other diseases.

I have, &c.  
(Signed) AMPHILL.

Inclosure in No. 16.

*Fifth Report by Dr. Koch.*

I HAVE the honour, in continuance of my Report of the 16th December of last year respecting the work of the Cholera Commission in Egypt, further to report to your Excellency as follows:—

The Commission was favoured by the action, sympathy, and best support of the authorities and superiors of hospitals here. Nearly all the cholera corpses to be dissected in the hospitals of the town were able to be used for the investigation. Up to the present time choleraic morbid matter has been taken from altogether nine dissections and from eight cholera patients. The cases succeeded one another at nearly equal intervals, in exactly such a way as to afford sufficient time for their investigation in every direction. Several cases which terminated fatally after a very brief course, and without being complicated by the presence of other morbid conditions, as they were able to be dissected very shortly after death, supplied excellent specimens for investigation. It is owing to these favourable circumstances that the Commission has already been able to make material progress in the accomplishment of the task committed to it.

To begin with, the microscopic examination demonstrated the presence in all these cases of the same bacilli in the cholera intestine as had been found in Egypt. In my Report of the 17th September last I was unable to state positively whether these bacilli, unlike so many other bacteria, belong to the habitual parasites of the human intestines, or whether they might not be only strangers who had been enabled by the cholera process to penetrate into the intestinal mucous membrane. We had not then been able to observe characteristics sufficiently marked to distinguish these bacilli from other very similarly shaped intestinal bacilli. This lacuna has now, however, fortunately been filled. For, by the help of methods perfected in the Board of Health, which proved particularly excellent on this occasion, we were enabled to isolate the bacilli from the contents of intestines in cases of unmixed cholera, and to propagate them artificially. The close examination of the artificially propagated bacilli then led to the discovery of some very



characteristic properties respecting their form and growth in the nutritive gelatine, whereby they may be with certainty distinguished from other bacilli. The means was hereby afforded of definitively settling the question whether these bacilli belong to the usual inhabitants of the intestine, or whether they occur exclusively in the intestines of cholera patients.

At first, by means of the bacilli propagated in gelatine, the bacilli from the fæces of cholera patients and from the intestines of cholera corpses, were shown to exist, and this was able to be done in all the cases investigated here. Then the intestinal contents of other corpses was similarly examined, and it was found that in these cases the cholera bacilli were always absent. Up to the present time eight subjects deceased from pneumonia, dysentery, phthisis, and disease of the kidneys, have been examined. Further, the contents of the intestines of various animals, as well as other substances teeming with bacteria, essayed, but hitherto no bacilli resembling those of cholera were anywhere found. Should this discovery prove constant in continued investigations, a most important result would be gained; for if these bacilli, endowed with special qualities, belong exclusively to the cholera process, then the causal connection between the presence of these bacteria and the cholera process would scarcely admit of any doubt, even if all endeavours to induce the disease upon animals should fail. In this last regard, however, matters seem to be taking a favourable turn, as recently experiments made upon animals have furnished results which allow us to hope for further results.

Together with these labours, the Commission has likewise been engaged in acquiring as much information as possible upon the subject, in the highest degree interesting and important, of the behaviour of the cholera in the city of Calcutta. In cities beyond the confines of India, which are only exposed to the cholera at long intervals, the influence of sanitary improvements, such as the supply of good drinking water, drainage, &c., upon the cholera cannot be determined with certainty, as the immunity of such a place once, or even oftener, may always be due to accidents. On the other hand, in towns which, like Calcutta, show a serious yearly mortality from cholera, such measures as counteract the disease must insure a more or less noticeable and constant diminution in the mortality statistics.

Now, in Calcutta, in fact, since the year 1870, the cholera has decreased in quite a remarkable way. Before 1870 the annual mortality from cholera in Calcutta was, on the average, 10·1 in 1,000 inhabitants. Since 1870 it has diminished to 3, that is, more than threefold. This is a fact which deserves the greatest attention, and must serve as an indication for the successful combating the malady. In the almost unanimous opinion of the medical men here, the decline of the cholera is due alone to the introduction of a conduit of potable water. It will be an important task of the Commission to form an independent opinion on this question from its own inspection and examination. With the same object, the Commission has visited the waterworks and the canalization arrangements of Calcutta. A number of samples of the river water before and after filtration have also been examined in the waterworks of Pultah, and the water borne to the town has been found to be of excellent quality.

I have seen from medical journals that the French Commission sent to Egypt to investigate the cholera, in its Report declares it has reached other results than those which were most respectfully announced by me, and has found organisms, supposed to be peculiar to cholera, in the blood. It might appear from this that the German Commission is pursuing its investigations in a wrong direction, and I consider it therefore due respectfully to lay before your Excellency my views upon these statements.

In the blood of a healthy man there are found together with the red and white sanguineous corpuscles, small, roundish, pale protoplasmic bodies, the so-called "blutplättchen," or blood-disks, in varying numbers. In many febrile disorders, such as spotted typhus, pneumonia, these forms become highly multiplied, and are often considered to be bacteria, by reason of their similarity to micro-organisms. Also, in the blood of cholera patients and of cholera corpses they are almost regularly multiplied, as we can also affirm, from the cholera cases which we investigated. This fact is not, however, new, but has been already mentioned by previous investigators. D. D. Cunningham, for instance, in his work, "Microscopical and Physiological Researches into the Nature of the Agent producing Cholera," already gave an excellent picture of these protoplasms of cholera blood in 1872. Now, as the most approved methods of research enable no other bacteria-like form to be recognized in the cholera blood, and as the description furnished by the French Commission suits these protoplasmic bodies in every way, I cannot but suppose that the French Commission has fallen into the same error as other investigators before it, and mistaken these protoplasts for specific organisms.



That these bodies should have any causal connection with the cholera is not possible, since they are found in the blood of healthy persons or persons suffering from other diseases.  
Calcutta, January 7, 1884.

## No. 17.

*Consul Cookson to Earl Granville.—(Received February 28.)*

My Lord,

*Alexandria, January 13, 1884.*

I HAVE the honour to transmit to your Lordship herewith a despatch from Dr. Mackie, dated the 10th instant, inclosing a copy of the Minutes of a meeting of the Maritime and Quarantine Sanitary Board, held on Tuesday, the 4th December, 1883.

I have, &c.  
(Signed) CHAS. A. COOKSON.

## Inclosure 1 in No. 17.

*Dr. Mackie to Consul Cookson.*

Sir,

*Alexandria, February 10, 1884.*

I HAVE the honour to transmit herewith copy of the Minutes of a meeting of the Maritime and Quarantine Sanitary Board, held on Tuesday, the 4th December, containing:—

1. Notification by Board of Health of Cairo of last cases of cholera in Upper Egypt, and cessation of cattle plague in Lower Egypt. Discussion thereon, and modifications, in consequence, to be adopted in issuing Bills of Health.

2. Disease amongst sheep arrived at Alexandria, and sanitary measures to be adopted.

3. Contravention of quarantine rules by a Colonel of the gendarmerie at Ismailia.

4. Question of embarking provisions at Kosseir for the Hedjaz; demand of the Egyptian Minister of the Interior to exempt the porters engaged in shipment from quarantine. Objections raised by some of the members.

5. Communications from Dr. Chaffey Bey on cholera at Mecca.

6. Cholera news from quarantine station at Tor.

7. Communication by the Delegate of France on the subject of the French transport "Creuze," denounced at a former meeting for non-observance of quarantine rules in Suez Canal.

The rest of the matter in the Minutes is chiefly administrative and disciplinary.

I have, &c.  
(Signed) J. MACKIE.

## Inclosure 2 in No. 17.

*Extract from the Minutes of the Meeting of the Maritime Sanitary and Quarantine Board, held December 4, 1883.*

(Translation.)

THE Secretary read a letter from the Public Health Board, of the 20th November, from which it appeared that the last cases of cholera in Upper Egypt occurred in the Province of Assiout, at Rounah, on the 12th October, and at Esneh on the 15th.

The Chairman then said that on the authority of the Public Health Board he proposed to alter the indorsement on Bills of Health to the following:—

"According to official information no death from cholera has been noted in the interior since the 15th October last.

"At Alexandria no death from cholera has been noted since the 1st December."

*Dr. de Castro* inquired whether the recently-appointed Sanitary Committee went on noting the deaths from cholera which occurred in Alexandria.

*Dr. Freda Bey* replied that all cases reported to the Sanitary Inspectors were looked into by one or two members of the Committee.

*Dr. Klodzianowski* protested against any alteration in the indorsement, as the statement made by the Public Health Board was founded on information which was not reliable.

*Dr. de Castro* stated that that very morning a cholera patient had been taken to the Greek Hospital; he therefore proposed to amend the Chairman's proposal as follows:—

"Cholera has ceased to exist in Egypt since the 15th October last, except at Alexandria, where a few cases still occur."

The Chairman's proposal having priority was then put to the vote, and carried by 11 to 4. The Board thus decided that the indorsement on Bills of Health and sanitary certificates should, for the future, be that proposed by the Chairman.

No. 18.

*Lord Amthill to Earl Granville.—(Received March 21.)*

My Lord,

*Berlin, March 18, 1884.*

WITH reference to my despatch of the 19th ultimo, I have the honour to inclose copies of an extract from a further report by Dr. Koch on cholera, dated Calcutta the 2nd ultimo.

In this Report Dr. Koch reverts to the question whether the bacilli found in the intestines of cholera subjects are parasites peculiar to the disease or not.

He refers to the pathological difficulties of the question, especially to the fact that death instead of ensuing when the disease is at its height, generally occurs during the period of reaction, when considerable changes have already occurred in the intestines, and when it is consequently impossible to obtain a clear diagnosis of the process of the disease. These difficulties the Commission have succeeded in overcoming.

In his Report of the 7th January last, Dr. Koch explained that choleraic bacilli were distinguishable from other bacteria; their most notable characteristic is their shape, not rectilinear (as are other bacilli), but curved in the shape of a comma, occasionally even semicircular; when the bacilli are separately reared ("Reinkulturen"), they are found also in the shape of the letter "S." They are capable of motion. It is especially noteworthy that the bacilli, when reared in gelatine, form at first colourless colonies which appear like glittering crumbs of glass. Little by little these colonies spread through the gelatine, and by their peculiar appearance can be distinguished and isolated from other bacteria.

Up to the date of this Report twenty-two cholera corpses and seventeen cholera patients had been examined. All these cases were tested by gelatine-culture, and also by the microscope, and in every case (as occurred also in Egypt) these specific bacteria were regularly found in the intestines of cholera patients.

Not content with this, the Commission, to test the accuracy of their theory, examined twenty-eight other corpses (of which ten were dysentery cases) and also the excreta of patients suffering from dysentery-diarrhoea, as well as of persons in good health, and also of those who had recovered from cholera, and of animals; they also tested putrifying and fouled water; but though all these materials were "extremely rich" in bacteria, in no single case was the cholera bacilli to be detected.

Experiments were also made by poisoning an animal with arsenic (a treatment which brings on an illness similar to cholera), but no choleraic bacilli were found in the digestive organs of the animals thus treated.

"From these results the conclusion is to be drawn that the comma-shaped bacilli are only to be found in cholera cases."

With regard to the relation of these bacilli to the disease, either their growth must be favoured by the cholera, or the species is itself the origin of the malady. The first opinion, says Dr. Koch, is not admissible. For if so, it must be presupposed that a patient when seized by the cholera, already has this species of bacteria in his digestive organs; and further, that since these bacilli have been without one single exception always found in the relatively large number of cases examined in Egypt as well as in India—two non-contiguous countries—they must exist in every human being.

This, however, is not the case, since, as above stated, the comma-shaped bacilli are only to be found in cholera cases.

Even in such cognate diseases as dysentery and catarrh of the intestines, they are not discoverable. Were they generally present in the human body they would have been detected ere this; but this has not been the case.

There remains then the opinion that these bacilli are the cause—not the effect—of the cholera. Many circumstances point to this conclusion, first and foremost that their presence is limited to the organ affected by the disease, viz., the bowels. Dr. Koch



gives a long description of his investigations in this respect, both on the living and the dead, and the evidence in both cases agree.

From these investigations it results that the first appearance of the parasites synchronizes with the outbreak of the disease; that they increase in number as the malady gains in intensity, and disappear as the cholera gradually wears itself out.

Dr. Koch admits it would be more satisfactory, were it possible to artificially generate with these bacteria a disease in animals analogous to cholera, and so demonstrate *ad oculos* their causal relation to the disease. This, however, has not yet been accomplished, and it appears doubtful whether it ever will be possible, since animals are in all probability not susceptible of choleraic infection. Were it anywhere possible it would be in Bengal, where all the year round, and all through the land, infected matter is scattered about; but no single case has yet been authenticated.

Nor is this non-susceptibility of animals an exceptional case, or a reason for doubting the correctness of the opinion enunciated above. Specific bacteria are also found in cases of leprosy and abdominal typhus; these two diseases are known to be caused by these bacteria; but neither are transmissible to animals.

Dr. Koch then proceeds to enumerate several other experiments made with the cholera bacilli. If cholera excreta, or the intestines of cholera corpses, are placed on linen, blotting-paper, or, best of all, on a surface of damp earth, in twenty-four hours' time the matter will be found changed into a thick mass of cholera bacilli.

Another important peculiarity of the choleraic bacteria is that when dried they die quicker than almost any other such parasites; generally speaking they are dead after three hours' drying; they thrive only on alkaline nutriment; acids, which do not much influence the growth of other bacteria, prevent the development of the cholera bacilli.

Lastly, with regard to the important question of cholera infection, Dr. Koch, while admitting that cholera poison does not maintain itself for longer than about three or four weeks, states that it is conceivable that some other form of preservation may exist in which the bacilli can maintain life in a dried state for several weeks, and in which they may be able to resist the otherwise destructive working of the digestive organs of the stomach. Such has not yet, however, been proved to be a fact.

The Commission have devoted their spare time to collecting evidence bearing on the state of India, and especially of Bengal, "the endemic cholera land," with regard to the cholera, and to examining the subjects enumerated in Dr. Koch's Report of the 16th December, heading 7.\*

They have also visited the various cholera centres in Calcutta, and its immediate neighborhood, especially Fort William and the prison at Alipore.

I have, &c.  
(Signed) AMPHILL.

#### Inclosure in No. 18.

*Extract from further Report by Dr. Koch, dated Calcutta, February 2, 1884.*

THE question left unsettled in my last Report of the 7th January, viz., whether the bacilli found in cholera intestines are exclusively choleraic parasites, may now be regarded as solved.

The ascertainment of the true state of the case was at first a matter of extraordinary difficulty on account of the dissimilar relations under which the pathological alterations in the cholera gut present themselves, and the great number of bacteria always present in the intestine. In the generality of cases death does not ensue at the climax of the cholera process, but in the immediately subsequent period of reaction in which such important changes supervene in the condition of the intestine and its contents, that it is impossible in such cases to obtain a clear idea of the cholera process. For this reason it was necessary to use the greatest reserve in assigning a significance to the cholera bacteria which had been found, and to refrain from any definite judgment upon their causal relation to the cholera until absolute conviction thereof should have been attained.

In the last Report I was able already to state that peculiar characteristics had been discovered in the bacilli of the cholera intestine, by which they could with complete certainty be distinguished from other bacteria. The bacilli are not quite rectilinear like

the other bacilli, but slightly curved like a comma. The curvature is sometimes sufficient to give the bacillus a semicircular form. In the artificially propagated specimens from these curved little rods are often produced "S" shaped figures, and shorter or longer, slightly wavy lines, of which the first correspond to two individuals; and the second a greater number of the cholera bacilli which have remained together in the process of continued multiplication. They are, moreover, possessed of independent movement, which appears very lively, and may best be observed in a drop of nutrient solution suspended under a cover-glass. In this preparation the bacilli are seen to swim with great rapidity in every direction across the microscopic field of vision.

Their behaviour is particularly characteristic in nutrient gelatine where they form colourless colonies, which are at first compacted, and look as if they were composed of strongly lustrous fragments of glass. Gradually these colonies create currents in the gelatine and diffuse themselves to a moderate extent. In gelatine propagation they can, accordingly, by this peculiar appearance, be recognized with great certainty among other colonies of bacteria, and can also be easily isolated from them. They can, too, with tolerable certainty be distinguished when propagated in concave object glasses, as they always affect the edge of the drop of nutrient medium where one can recognize them by their peculiar movements, and upon the employment of aniline colouring solution, by the comma-like form.

Hitherto, twenty-two cholera corpses and seventeen cholera patients have been the subject of investigation in Calcutta. All these cases were investigated both with the help of gelatine propagation, and also in microscopic preparations, as well as generally of specimens in concave object glasses with reference to the presence of the specific bacteria, and in all cases these comma-like bacilli were observed.

This result, taken together with that which was obtained in Egypt, justifies the conclusion that this kind of bacteria is regularly found in the cholera intestine.

For the sake of controlling these results, twenty-eight other corpses (eleven of them dysentery subjects) were submitted to exactly the same investigations, further the evacuations from a case of simple diarrhoea, of dysentery, and from a healthy individual after recovery from cholera, likewise of several healthy persons, and also of animals who had died from ulcerated intestine and pneumonia, and, finally, with putrid specimens of befouled water (various samples from foul rinsings, water from very foul marshes, marsh mud, dirty river water). In no single instance, however, were we able to ascertain the presence of the cholera bacilli either in the stomach or the intestine of men or of the animals, or in the evacuations or in the liquid matters which teemed with bacteria. As arsenical poisoning may induce a process of disease very similar to cholera, an experiment of this nature was tried, and the digestive organs of an animal that had been poisoned with arsenic were investigated for the comma-like bacilli, but also with negative result.

From these results is to be drawn the further inference that the comma-like bacilli are alone peculiar to the cholera.

As regards the relation of these bacteria to the cholera, it may, as already explained in a former Report, be either of such a nature, that the growth of this specific kind of bacteria is only promoted by the cholera process, and, therefore, is combined in such a striking way with the cholera, or that the bacteria are the cause of the cholera, and the malady is produced only when these specific bacteria have found their way into the human intestine. The first hypothesis is excluded for the following reasons:—It must, for instance, be presupposed that a man, when cholera-stricken, already has this kind of bacteria in his alimentary canal, and, further, as these particular bacteria, both in Egypt and India, two quite separate countries, in a proportionately large number of cases have been shown to exist, without exception, that every human frame must contain them. But this cannot be the case, for, as already stated, the comma-like bacilli are never found except in cholera cases. Nor do they occur even in intestinal affections, such as dysentery and intestinal catarrh, to which cholera is very often super-added. Moreover, it cannot be supposed that, were these bacteria regularly present in the human body, they should not at any previous time have been observed, as, in fact, they have not.

As thus the vegetation of these bacteria in the intestine cannot be induced by the cholera, there remains only the second hypothesis, viz., that they are the cause of the cholera, and that this is really so a large number of facts tends to show in an unmistakable manner, above all their behaviour during the process of the disease. Their presence is limited to the organ which is the seat of the disease, i.e., the intestine. In vomits they have been up to now only twice observed, and in both these cases the appearance and the alkaline reaction of the vomited liquid showed that matter from the



intestine, and therewith the bacteria, had found admission to the stomach. In the intestine itself they behave as follows: In the first evacuations of the patients, as long as they are of genuinely *faeculent* character but few cholera bacilli are found; the succeeding watery, inodorous dejections, on the other hand, contain the bacilli in abundance, while, at the same time, all other bacteria almost entirely disappear, so that the cholera bacilli at this stage of the malady are almost isolated from all other bacteria. As soon, however, as the cholera abates and the evacuations resume the *faeculent* character, the comma-shaped bacteria gradually disappear again, and upon the complete recovery of the patient are no more to be found. The results of examination of the cholera corpses is similar. No cholera bacilli are found in the stomach. The state of the gut varies according as death supervened during the actual attack of cholera or after it. In the freshest cases in which the intestine presented a uniform bright red tint, the mucous membrane is as yet free from infiltration of blood, and the contents of the intestine consist of a whitish inodorous fluid, the cholera bacilli are found in the intestine in enormous masses, and almost without admixture of other kinds of parasites. Their distribution corresponds very closely to the degree and extent of inflammatory irritation of the intestinal mucous membrane, being generally less numerous in the upper part of the small intestine, and more abundant near its inferior extremity. But when death has occurred at a later stage, the signs of a serious reaction are found in the intestine. The mucous membrane is of a dark red hue in the inferior part of the small intestine, permeated with extravasated blood and often mortified in the superficial coats. The content of the intestine is in this case more or less tinged with blood, and, in consequence of the now renewed copious development of decomposition bacteria, of putrid character and fetid. At this stage the cholera bacteria become less and less prominent, but are still for a while pretty copiously present in the follicular glands, a circumstance which at first directed attention to the presence of these peculiar bacteria in the intestine in Egyptian cholera cases. They are wanting entirely only in cases where, after recovery from cholera, death has been due to a succeeding malady.

The cholera bacteria thus behave exactly like all other pathogenic bacteria. They are found exclusively in the disease with which they are connected; their first appearance coincides with the beginning of the malady. Their habitat likewise corresponds to the extent of the process of the disease, and their quantity is at the climax of the disorder so great as to explain their destructive effect upon the intestinal mucous membrane.

It would of course be desirable to succeed in artificially inducing upon animals, by the employment of these bacteria, a malady analogous to cholera, in order to afford ocular demonstration of their causal relation to the disease. This, however, has not succeeded, and it must accordingly be considered questionable whether it will ever succeed, since, according to all appearances, brutes are not susceptible of choleraic infection. Could any species of brute have contracted cholera this must have occurred in Bengal, where choleraic infectional matter is spread throughout the whole year and the whole country: it must have been noticed occasionally in a reliable manner. But all inquiries on the subject have resulted negatively.

Yet the cogency of the above-mentioned facts cannot be impaired by the failure of experiments upon animals. The same phenomenon confronts us in other infectious diseases. Thus, for instance, in abdominal typhus and lepra, two diseases in which specific bacteria likewise occur, it has not been hitherto found possible to communicate these maladies to animals, and yet the kind of bacteria and manner of their occurrence in these diseases is such that the bacteria must incontestably be viewed as the cause of the disorder. The same holds good of the cholera bacteria.

Moreover, the further study of the cholera bacteria has supplied information respecting several more of their peculiarities, which are in harmony with what is known about cholera etiology, and accordingly may serve as further confirmation of the correctness of the hypothesis that the bacilli are the cause of cholera.

Most remarkable in this connection is the repeatedly-made observation, that in the linen of cholera patients, when it was befouled with the dejections, and was kept for twenty-four hours in a damp state, the cholera bacilli increased in quite an extraordinary way. This behaviour may afford an explanation of the known fact, that cholera linen so often gives rise to the infection of those persons who have to do with it. Notice having been drawn to this, further essays were made, and it was found that the same phenomenon occurred if cholera dejections or intestinal contents of cholera corpses were spread over the damp surface of linen, blotting-paper, and most especially on the surface of damp earth. After twenty-four hours the thin outspread coat of slimy matter was wholly transformed into a teeming mass of cholera bacilli.

A further very important property of the cholera bacteria is, that they perish sooner after desiccation than almost any other kind of bacteria. Life is generally quite extinct in them after three hours of desiccation.

It has been further ascertained that their growth proceeds normally in nutrient substances with alkaline reaction. Even a very small quantity of free acid which has no perceptible influence upon the growth of other bacteria strikingly retards their development.

In a normally acting stomach they are destroyed, as appears from the circumstance that repeatedly in animals to which cholera bacilli had been constantly administered, and which had afterwards been killed, the bacilli could not be traced either in the stomach or the intestinal canal. This last named peculiarity, together with the slight power to resist the effects of desiccation, serves to explain what is daily observed, viz., how seldom cholera is contracted by immediate intercourse with cholera patients and their products. Hence the concurrence of other circumstances is clearly necessary in order that the bacilli may be put into a condition to pass the stomach, and then to provoke the cholera process in the intestine. Perhaps the bacilli may pass uninjured into the stomach if digestion is disordered, a supposition favoured by the observation made in all cholera epidemics, and also regularly here in India, that such persons very frequently contract cholera who have been suffering from indigestion. Perhaps also a particular condition in which these bacteria are placed, and which may be analogous to the permanent condition of other bacteria, may enable them to pass the stomach uninjured.

It is of course not probable that this change consists in the production of permanent spores, as such spores according to experience remain capable of life for many months, and even for years, while the cholera virus does not remain active longer than about from three to four weeks. Notwithstanding this it is quite conceivable that some other kind of durable condition exists, in which the bacilli may remain alive several weeks in a dry state, and in which they are able to withstand the destructive action of the stomachic digestion.

The change to such a condition would correspond to what Pettenkofer has named the maturation of the cholera infectional virus. Hitherto attempts to discover such a permanent condition of the cholera bacilli have failed.

The Commission has employed the time not taken up by experimental labours to collect ample material relating to the cholera conditions of India, and especially of Bengal, the domain of endemic cholera, corresponding to the points given under No. 7 in my Report of the 16th December of last year.

Further, several points of great importance with regard to the cholera in Calcutta and its immediate neighbourhood were viewed, among which may be specially mentioned Fort William and the Central Prison in Alipore.

#### No. 19.

*Lord Amthill to Earl Granville.—(Received April 9.)*

My Lord,

*Berlin, April 2, 1884.*

WITH reference to my despatch of the 18th ultimo, I have the honour to inclose copies of a further Report upon cholera which has been received from Dr. Koch, and which is dated Calcutta, the 4th March.

In this Report Dr. Koch calls attention to the frequency of small local epidemics of cholera, generally in the neighbourhood of so-called "tanks." These tanks, of which there are an innumerable number scattered all over Bengal, consist of a group of huts built around a small pond, often of a marshy nature, the water of which is used by the inhabitants for various purposes: such as washing, bathing, and not unfrequently also for drinking. It is evident, therefore, that such water cannot be of a wholesome nature, especially if we consider that latrines of a very primitive sort are not uncommonly erected on the banks, the contents of which are allowed to filtrate into the ponds. These tanks, therefore, as a rule, contain water highly impregnated with filth, and one can now understand why Indian doctors trace the cause of such local cholera epidemics to the badness of the water. Such tank epidemics are by no means rare, and every cholera doctor can cite a certain number of them. Dr. Koch therefore begged the Sanitary Commissioner with the Government to let him know should such a tank epidemic occur within easy distance of Calcutta. Such a case occurred shortly after at Saheb Bagan, a suburb of Calcutta. In this case the cholera epidemic was entirely limited to the inhabitants, about 100 in number, who lived around the pond, seventeen of these died of cholera, while at some distance from the tank, and in the other parts of the same police



district, no cases of cholera were reported. It may be interesting to note that this place had been visited by repeated epidemics of cholera in recent years.

Careful researches were made by the Commission as to the origin and course of the epidemic. It was ascertained that the water of the pond had served the inhabitants in the usual way for bathing, washing, and drinking purposes, and that even the linen of the first person who had died of cholera, soiled as it was with cholera ejections, had been washed in the tank. Several samples of the water were taken from different parts of the pond, and at different times, and submitted to examination (the method of cultivation on gelatine being used), and it was found that the first samples taken were pretty richly charged with the cholera-bacillus. Of the samples collected towards the end of the epidemic, only one was found to contain a small quantity of the cholera-bacillus, and this sample had been taken from a particularly dirty portion of the pond. When one considers that till now a fruitless search had been made for the cholera-bacillus in water charged with sewage matter and other impurities, and that now for the first time these germs have been found in a pond, in the neighbourhood of which raged a cholera epidemic, then this discovery must be looked upon as of the greatest importance. It is proved that the pond was infected by the soiled linen of cholera patients, which we know by experiments to be highly charged with the cholera-bacillus; secondly, it is proved that the inhabitants used this water for drinking purposes. These facts would therefore tend to confirm the belief that the cholera-bacillus is the cause of the disease, and not merely a result of it.

This case is the only one of its kind which has been as yet examined, but still it is important in showing one of the ways in which the germ of the disease can be introduced into the human body, and Dr. Koch feels certain that in other similar cases of cholera outbreaks the presence of the bacillus in the water could be proved.

Since writing his last Report Dr. Koch has examined twenty cholera corpses and the ejections of eleven cholera patients without obtaining any new results, but confirming those previously obtained.

Some experiments are also being made to discover the action of certain substances such as corrosive sublimate, carbolic acid, and other disinfectants, on the development of the bacillus when artificially cultivated, and also to discover what effect the presence of carbonic acid, or the cultivation in vacuum, may have upon the germ. Experiments are likewise still energetically carried on to discover under what conditions the cholera-bacillus may retain its vitality. No definite results have as yet been obtained. The only way to keep the cholera-bacillus for any time alive is to collect the germ before it is dry. In liquids the bacillus retains its vitality for several weeks, and everything tends to prove that the infection can only be efficiently conveyed into the human body when in a damp state.

Dr. Koch concludes his Report by stating that the heat of the weather will necessitate the Commission to suspend its labours for a time.

I have, &c.  
(Signed) AMPTHILL.

Inclosure in No. 19.

*Report by Dr. Koch.*

I HAVE the honour to most respectfully report to your Excellency the following further results:—

It is a remarkable fact that the cholera, even in territories where it is endemic, appears to be attached to certain localities, and to constitute there unmistakable and clearly marked off epidemics. Such local epidemics are observed to be especially frequent in the neighbourhood of the so-called tanks. It should be mentioned in explanation that the tanks distributed in countless numbers over the whole of Bengal are small ponds and morasses surrounded by huts, from which the neighbouring inhabitants derive the whole of their water supply, and which are used for the most various purposes: for bathing, washing of clothing, cleansing household utensils, as well as for the supply of drinking water.

That these various purposes for which the tank water is employed defile it and deprive it of all the qualities required by sanitary principles needs no demonstration. As if, however, this were not enough, it very often happens that latrines, if arrangements of the most primitive description may so be named, are found situated on the bank of the tank and voiding their contents into it, and that in general the margin of the tank serves as a place of deposit for every kind of filth, and especially for human ordure.

The tanks accordingly, as a rule, contain very foul water, and such a state of things at once explains why the medical men here connect these epidemics of cholera, which centre round a tank, with the bad quality of the tank water. Such tank epidemics are by no means rare, and almost every medical practitioner, who has had extensive cholera experience, is acquainted with a greater or less number of examples. I have, accordingly, from the outset directed my attention to this point, and requested the Sanitary Commissioner with the Government to let me know should such an epidemic arise within an easily attainable distance of Calcutta. This has happened during the last few weeks. For a few days unusually numerous cholera cases were reported from Sahab Bagan, at Baliaghatta, one of the suburbs of Calcutta. The attacks were limited exclusively to the huts inhabited by several hundred persons situate round a tank, and out of this population seventeen persons died from cholera, while at some distance from the tank, and throughout the same police district cholera did not prevail. It is worthy of note that the same spot has been in recent years repeatedly visited by the cholera. Upon the origin and course of the epidemic careful investigations were now instituted by the Commission, wherefrom it appeared that the tank was used in the usual way by the neighbouring dwellers for bathing, washing, and drinking, and also that the soiled linen of the first fatal cholera case was cleansed in the tank. A number of samples of the water were then taken from different parts of the tank, investigated by means of culture in nutrient gelatine, and cholera bacilli found in considerable abundance in several of the first specimens. Of the later samples which were procured towards the end of the epidemic, only one, which came from a particularly foul part of the tank, contained cholera bacilli, and these only in very small number. When it is remembered that hitherto cholera bacilli have been vainly sought for in numerous samples of tank water, sewage, river water, and other water exposed to all sorts of impurities, and that these bacilli, with all their characteristic peculiarities, have been found for the first time in a tank around which cholera epidemic was raging, this result must be regarded as a most important one.

It is evident that the water in the tank was infected by the cholera linen, which, as earlier investigations showed, usually contains the cholera bacilli in special abundance; it is further proved that the dwellers by these tanks used this infected water for domestic purposes, and, indeed, for drinking. We have here, therefore, an experiment, due to chance, upon the human subject, which, in this case, compensates for the failure of infection experiments upon animals, and further corroborates the hypothesis that the specific cholera bacilli are in reality the cause of the disease.

Hitherto this fact remains isolated however, but it points to the way in which the cholera poison can find access to the human body, and I do not doubt that, in other similar cases, the demonstration of the presence of cholera bacilli in water or other vehicles for the transmission of the virus will be effected.

Since my last Report further investigations have been conducted upon 20 cholera corpses and the dejections of 11 cholera patients, making the total number of cases examined in India: 42 cholera corpses and 28 cholera patients. These last cases have not of course given any fresh results. They resembled the former cases in every particular, and specially in the comportment of the cholera bacilli.

Further, thorough investigations were continued indefatigably into the influence of different substances, such as sublimate, carbolic acid, and other disinfectants upon the development of the cholera bacilli in nutrient liquids; also upon their behaviour in carbonic acid and in vacuo. The researches for the purpose of showing a permanent form of these bacilli were also prosecuted unremittingly. Nothing of the kind has, however, yet been found. The only possibility of preserving the capability of life for a long time in the cholera bacilli is to preserve them before they dry up. In liquids they remain for weeks capable of development, and everything goes to show that they can only be consumed and incorporated into the human body in an active condition when they are in a moist state.

Unfortunately, further investigations upon this subject must be given up, owing to the hot season, which has set in very early this year. During the last weeks the temperature has already been so high that only under the greatest difficulties could work be carried on in the laboratory; but within the last few days the heat has become almost insupportable, and nothing remains to do but provisionally to break off our labours.

(Signed) DR. KOCH.

To the Secretary of State for the Interior,  
His Excellency, Minister of State, v. Boetticher.





FURTHER REPORTS respecting the Cholera Epidemic in Egypt and the Proceedings of the German Scientific Commission.

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